

# JOURNAL *of* FARM ECONOMICS

## CONTENTS

Knowledge for What in the Northern Great Plains: A Symposium.....	<i>M. M. Kelso</i>	353
Farmers Adaptations to Income Uncertainty.....	<i>Rainer Schickele</i>	356
Stabilizing Farming by Shifting Wheat Land to Grass in the Northern Great Plains.....	<i>Lloyd E. Jones</i>	375
Institutional Methods of Meeting Weather Uncertainty in the Great Plains.....	<i>E. Lloyd Barber and Philip J. Thair</i>	391
Space as a Social Cost.....	<i>A. H. Anderson</i>	411
Land and Water Development Programs in the Northern Great Plains.....	<i>Harry A. Steele and John Muehlbeier</i>	431
Bases of Adjusting International Trade in Foodstuffs.....	<i>John D. Black</i>	445
The Milkers' Unions of the San Francisco and Los Angeles Milksheds .....	<i>Ernest Feder</i>	458

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# CONTENTS (continued)

## NOTES

Technical Progress in Agriculture.....	Robert M. Salter	478
Economic Aspects of Technical Progress.....	Sherman E. Johnson	485
Some Characteristics of Agricultural Land Leasing in Egypt.....	Hassan Aly Dawood	480
The Stanford Food Institute on "International Commodity Stockpiling as an Economic Stabilizer".....	Oscar Zaglits	495
Teaching Undergraduates in Agricultural Economics.....	R. L. Kohls	500

## BOOK REVIEWS

Western Land and Water Use.....	Roland R. Renne	503
The Western Range Livestock Industry.....	Harold G. Halcrow	505
Agricultural Progress in the Cotton Belt Since 1920.....	R. J. Saville	506
How to Make Your Farm Pay.....	Lowell S. Hardin	509
Economics with Application to Agriculture.....	G. E. Brandow	511
The Socialized Agriculture of the USSR.....	V. Katkoff	512
The New World of Southeast Asia.....	Charles J. Shohan	515
International Wheat Agreements, International Journal of Agrarian Affairs.....	Robert G. F. Spitze	516
The Invasion of New Zealand by People, Plants and Animals.....	Gordon L. Burton	519
Horace Plunkett: An Anglo-American Irishman.....	Joseph G. Knapp	521
Garantia de Precos Estaveis e Remuneradores a Agricultura de Sao Paulo.....	William H. Nicholls	523
The Economics of Agriculture.....	Montell Ogdon	525
Public Finance and National Income.....	O. H. Brownlee	526
Congress Makes a Law.....	Walter P. Cotton	528
The Dynamics of Business Cycles.....	Gerhard Tintner	531

PUBLICATIONS RECEIVED.....	534
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NEWS NOTES.....	536
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# JOURNAL OF FARM ECONOMICS

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## KNOWLEDGE FOR WHAT IN THE NORTHERN GREAT PLAINS: A SYMPOSIUM

M. M. KELSO\*

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IN 1940, Professor R. S. Lynd wrote a book provocative and stimulating to social scientists of all branches. The special importance of Lynd's view is, as may be gathered from the very title of his book, *Knowledge for What?*,<sup>1</sup> that he emphasizes the question of purposes in social inquiry. . . . Lynd concerns himself with the gap between social science and existing social problems: how to make social sciences more useful 'instruments for the analysis of (society's) more critical problems and for the devising of indicated concrete programs of action.' It is in response to this query that he comes to emphasize the importance of working out research procedures that properly treat the 'behavior of people that provides the dynamics of change.'<sup>2</sup>

The Northern Great Plains are peculiarly beset by social problems for which concrete programs of action are required. Social scientists in the area have met the need head-on. They have been and are working diligently to close the gap between their science and the existing social problems.

It is to bring before social scientists elsewhere, and particularly before rural social scientists, a sample—a mere glimpse—of some of the "growing points" of "social science in action" in the Northern Great Plains that this symposium has been prepared.

The Northern Great Plains confronts man with a peculiar natural environment. Hot and dry, cold and stormy, treeless, waterless, a

\* Professor Kelso organized this symposium on the Great Plains.—Editor.

<sup>1</sup> Lynd, R. S. *Knowledge for What?* Princeton, 1940.

<sup>2</sup> Quoted from Salter, L. A., *A Critical Review of Research in Land Economics*. University of Minnesota Press, 1948, p. 49.

grand expanse of flat to gently rolling space; a climate that has no "normal" except variability and a variability of "good" and "bad" years that do not fluctuate randomly just from year to year but in "bunches."

When western European man finally overcame sufficiently the natural conditions and primitive cultures in the Plains to occupy and dominate them, he brought with him the ideas, the processes, the institutions of western Europe as they had been modified by 200 years in the eastern United States. But western Europe is a timbered, humid, watered environment; so is the eastern United States. The culture that rolled across the Great Plains had its roots in the timbered, humid, watered areas to the east.

Thus was the stage set for the more critical of the social science problems of the Great Plains of today. Wherein is the culture "out-of-joint" with its environment? What relevant hypotheses concerning individual and social action in the Plains can be devised by penetrating social analyses giving rise to plans of action which, if taken, will resolve the confusions, doubts and fears of the area?

Other areas of the world are also treeless and semi-arid. But apparently in no other like area in the world has the western European culture dominated. And what is yet more challenging to us, as Elmer Starch, Secretary of the Great Plains Council, has pointed out, there are no grounds provided by past similar experience anywhere in the world for assurance that any culture can survive permanently in the semi-arid plains environment.

In the face of this generalization, if true, man and the social scientist as his professional social diagnostician and physician have their work cut out for them. The social scientist in the Plains with his administrative, educational and political counterparts is facing up to the job; some of his results in the form of "growing points" of analysis and theory are set forth in the papers that follow.

Risk and uncertainty have a peculiarly important place among the fears of the Plains agriculturalist. "Maximizing income" isn't enough. Here, as in few other areas, "maximizing income" within some context of "stability" characterizes the entrepreneurial problem. To a degree and within limits, the individual entrepreneur can do some things independently to achieve this goal. Mr. Schickele and Mr. Jones explore certain aspects of the possibilities and limitations of "income with stability" found among the alter-

natives of choice available to the individual entrepreneur in the Great Plains.

But the limitations imposed on the entrepreneur are real and significant. His array of alternatives is not broad enough to permit him to achieve his goal. Certain institutional and cultural adaptations seem also to be required. Messrs. Barber and Thair explore certain of the more likely institutional modifications and inventions that seem to hold some promise of aiding the entrepreneur in attaining his goal of "income with stability."

And then there are certain problems of living in the Plains. It is likely that a maximized income with stability if attained by farm entrepreneurs in the Plains would aggravate rather than alleviate the relative inability of the Plains farmer, living in an unmodified culture pattern, to enjoy the advantages of a modern standard of living. The population pattern would be too sparse, even more sparse than now, to permit group organization, community life, schools, roads, government, electricity and telephones at a cost the families could afford over much of the area. Mr. Anderson looks into the nature of this problem and asks some penetrating questions concerning it. He has no more than lifted the veil a trifle on the nature and character of the problem. But exploration of the problem looking forward to hypotheses of solution is proceeding in the Great Plains.

Messrs. Steele and Meuhlbeier have described the more important public resource development programs that have been tried out in the Plains over the past 20 years. They indicate some of the accomplishments and some of the failures; they point to emerging needs and problems in public resource development programs of the future.

All in all, the social scientist in the Plains is making his science a more useful "instrument for the analysis of (society's) more critical problems and for the devising of indicated concrete programs of action."

## FARMERS ADAPTATIONS TO INCOME UNCERTAINTY

RAINER SCHICKELE\*

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### *The Theoretical Framework*

**W**HAT means are available to individual Plains farmers to pull through protracted periods of low crop yields and unfavorable prices?

Our frame of references is the individual farm as a going concern in which a farm family works and lives. Our focus is upon the impact of uncertainties peculiar to the region on the security and welfare of farm families. We are concerned with meeting extreme unfavorable contingencies rather than with maximizing a long-time level of net farm income, irrespective of the time aspects of income fluctuations.

### *Risk and Uncertainty Bearing*

One of the managerial functions is the assumption of risk. The entrepreneur acts on the basis of present factor costs and expectations of future product prices. The uncertainty of these expectations involves "price risks." If the expectations do not materialize at the time the products reach the market, marginal returns will fail to equal marginal costs. If prices fall below expectations, realized net income will be less than anticipated; if prices exceed expectations, net income will be less than it could have been had the future prices been correctly anticipated. In both cases a "loss" is engendered which represents the "cost" of uncertainty.

Yet there is a tremendous difference in the practical aspects of the "uncertainty cost" in these two cases. In the first case, a loss is actually sustained, and may be large enough to render the operator insolvent; in the second case the loss is hypothetical only, in the sense that his income could have been higher than it actually was. He received, however, a "windfall gain" rather than sustained a loss, in the sense that his income turned out higher than expected.

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\* The author acknowledges valuable criticism received from T. W. Schultz of the University of Chicago, E. Lloyd Barber and Phil Thair of BAE, and Layton S. Thompson of Montana State College.



Within the firm analysis, let us call the uncertainty cost of the first case "risk loss," of the second "risk gain."<sup>1</sup>

Traditionally, it is conceived that the enterpriser has two principal means for coping with uncertainty: (1) He can currently revise his production, inventory, and reserve plans so as to keep the discrepancy between expected and realized prices at a minimum<sup>2</sup> and (2) He can convert some types of possible future risk losses into currently budgeted fixed costs through an insurance program.<sup>3</sup>

In static equilibrium analysis, uncertainty is eliminated by the assumption of *known* prices, and solutions to the problem of optimum factor combinations are determinate. By introducing uncertainty into the analysis, solutions for individual firms become, in a strictly logical sense, indeterminate within a range set by alternative expectations, and depend upon common-sense assumptions concerning psychological propensities of the enterpriser which govern his choice among these alternatives. His operations become in part a function of his caution or venturesomeness, his liquidity preferences, his confidence in his expectations—i.e., of highly subjective judgment factors defying empirical measurement.<sup>4</sup>

#### *Flexibility in Production, Inventory, and Reserve Management*

Planning the management of a firm involves a complicated set of decisions, every one resting in some respect upon expectations of future events. Many of these anticipations have various degrees of uncertainty, and the time between the act and its outcome spans periods of widely varying length. When a sow is bred, the farmer expects a certain size of litter—it may vary from zero to 12, but he acts upon a fairly definite expectation of, say, six or eight, based on past experience with probability distributions. He hopes to market five or six at a certain weight, which requires a certain amount of feed costs, and to receive certain prices for the pigs

<sup>1</sup> Note that in macro-economic analysis, such risk losses or gains have no meaning other than as indicators of less than optimal combinations of factors due to uncertainty of expectations. Beyond that, the "risk loss" of one firm is balanced by corresponding "risk gains" of another, and the aggregate social product is unaffected.

<sup>2</sup> See J. R. Hicks, *Value and Capital*, Oxford, 1939, pp. 124–127; and A. G. Hart, "Anticipations, Uncertainty and Dynamic Planning," *Journal of Business*, University of Chicago, Vol. XIII, No. 4, Pt. 2, Oct. 1940, pp. 60–67.

<sup>3</sup> See Frank H. Knight, *Risk, Uncertainty and Profit*, Houghton Mifflin, N. Y., 1921, p. 245 ff.

<sup>4</sup> For an interesting suggestion as to how one might go about measuring prevailing behavior concerning risk aversion, or gambling, on the part of certain groups, see Friedman and Savage, "The Utility Analysis of Choices Involving Risk," *Journal of Political Economy*, August, 1948.

sold. From breeding the sow to marketing the pigs, nine to twelve months elapse. Usually a farmer will act upon the expectation to which he assigns the highest probability. Some of these expectations have a fairly strong modal concentration of probabilities, like the number of pigs farrowed and weaned; others have a wide probability dispersion, like hog prices one year ahead, and feed prices six to eight months ahead, and grain yields, particularly in the Great Plains.

The farmer plans his operations so that if his expectations materialize he will maximize his net income. As he moves through the production period he can revise his expectations at various points, and along with them his production plans. If hog prices develop less favorably than expected, he can feed his pigs less heavily and market them earlier, and can carry over larger supplies of feed grains into the next year (inventory management). If factor-product price relationships deteriorate badly he may be able to curtail production outlays and family living expenditures, and draw upon cash reserves previously accumulated (reserve management).

Flexibility in *production organization* to permit current revision according to changes in expectations increases with (1) diversification of enterprises; (2) degree of intensity (variability of input applications at the intensive margin); and (3) the proportion of variable costs in the total cost structure. Great Plains farming is low on all three counts. Production flexibility decreases with (4) length of production period and (5) product specialization. Plains farming, especially ranching, is high on both counts. *This means that production flexibility in the Great Plains as a device for risk aversion is severely limited on account of all five factors.*

Flexibility in *inventory management*, however, is relatively high, since grains can be stored easily, and the dry air keeps quality losses of grain and hay stocks rather low compared with humid areas.<sup>6</sup> Even in ranching there is considerable flexibility in "inventory management" regarding livestock numbers as well as forage supplies. The time incidence of poor crop or price conditions is such that long periods of excessive inventories may be required for individual farms to remain solvent.

Flexibility in *cash reserves* increases with (1) the size of the enter-

<sup>6</sup> Hedging in future markets can be interpreted as a special case of inventory management for avoidance of risk losses. Since its use by individual farmers is very small, it will not be discussed here. An examination of its potential usefulness may, however, be worthwhile.

prise, and decreases with (2) the proportion of fixed costs in the cost structure and (3) the degree of encumbrance or similar outside claims upon income (e.g., debt and rent payments and taxes). Plains farmers usually have medium sized enterprises with high fixed costs; their degree of encumbrance tends to be exceptionally low in good years and high in poor years. Still, for most farmers, cash reserves and credit have in the past not been sufficient to bridge the gap between good periods.<sup>6</sup>

These relationships are basic to the appraisal of the limits within which organizational flexibility can be used to meet the uncertainties characteristic of Great Plains agriculture.

It is obvious that such flexibility can be a fairly effective means of meeting some uncertainties. There are, however, others where flexibility is of little help. If all relevant product prices fall below expectations, with factor prices the same or higher than anticipated, organizational flexibility is of little avail. Similarly, if yields turn out much below expectations in all crops, flexibility in the crop system cannot help much to escape heavy risk losses. Dry-land farming in the Great Plains is vulnerable on both counts: grain prices are more variable than livestock prices, and crop yields are much more variable than in other major farming areas.

From the viewpoint of assessing implicit uncertainty costs, it is necessary to segregate the flexibility measures devised specifically to avoid risk losses, from those resulting from adapting factor and enterprise combinations to the *general* physical, economic, and market conditions. Uncertainty cost of production flexibility arises if a farmer foregoes income opportunities from, say, grain farming in a majority of years in order to be sufficiently diversified in a minority of years when specialization in grains would involve serious risk losses. As to inventory and cash reserve measures, only the actual and opportunity costs of holding "excess" reserves for the specific purpose of covering possible risk losses should be charged to uncertainty.

#### *Insurance vs. Credit Route of Risk Bearing*

A second means for meeting uncertainty is the budgeting of possible risk losses in regular installments over time, either before

<sup>6</sup>Capital rationing in the credit market is a severe handicap to Plains farmers. In poor years, when they need credit most, they get least. Consequently, higher inventory and cash reserves may be better justified than they would be with a more perfect capital market.

(through insurance), or after (through credit) the risk loss is sustained.

Uncertainty for the individual firm cannot be removed by insurance, not even in those circumstances where aggregate risk losses can be actuarially determined and converted into accurate insurance premium rates. Frank H. Knight's proposition that "a known degree of uncertainty is practically no uncertainty at all" holds only in the aggregate.<sup>7</sup> For the individual, the uncertainty of whether his crop will be hailed out still remains after he has paid his hail insurance premiums. All he does is accept the burden of an annual fixed cost in preference to a possible (but uncertain) future risk loss from hail damage. Were he to *know* that his coming crop would not suffer from hail, he would not pay his insurance premiums.

In any insurance program for one group, the premiums paid exceed indemnities received; while for another, the premiums fall short of indemnities. Hence, an insured person can never know beforehand whether his individual risk losses will be greater or smaller than his premium cost. In fact, the majority of persons carrying liability or fire insurance, for instance, never collect any indemnities at all, because they happen not to suffer any risk losses. They are, however, paying risk costs.

Insurance does not reduce the uncertainty of expectations of individuals, and therefore does not necessarily reduce the risk cost below what the risk loss might have been (the latter might have been zero). Hence, insurance does not necessarily optimize factor combinations. It *does, however, reduce or even eliminate the probability that a risk loss will be so heavy and concentrated in time as to cause extreme hardship or bankruptcy to the individual.*

Some types of risk losses might better be carried by amortized *credit after* the loss has occurred, rather than by *insurance premiums before* the loss. Under what conditions the risk burden might better be carried *post hoc via credit* than *ante hoc via insurance* is a fascinating question to which an answer would be of great practical usefulness.

There are many risk losses for which no insurance programs are available, and which the individual must bear by means of credit or by drawing upon reserves. For instance, even now, after a decade

<sup>7</sup> F. H. Knight, *op. cit.*, p. 47; Knight is, of course, fully aware of this. See especially Ch. VIII.

of experimentation, many Plains farmers still have no access to crop insurance. And in counties where crop insurance is available, many farmers do not participate, perhaps because they feel that the premium rates are too high and the coverage too low.

In the actual planning of the production process, there are "*limits of tolerance*" for uncertainty within which *expectation and event may diverge without affecting factor combination*. A farmer's crop system would probably be the same whether he knew for certain what the future prices of his crops would be or whether the probability dispersion of his expectations had a strong modal concentration within, say, five percent of the actual prices. I attach great practical and theoretical importance to the realistic assessment and formal recognition of these "limits of tolerance."<sup>8</sup>

To summarize: An individual enterpriser has some tolerance to uncertainty within the limits of which he sees no advantage in formally budgeting risk costs. Beyond these limits, however, his concern about possible risk losses asserts itself in managerial decisions. The *means for meeting the burden of possible risk losses* fall into three major classes: (1) flexibility in production, inventory, and reserve management; (2) insurance premiums budgeted *in advance* of risk losses; and (3) credit and budgeted repayment *after* risk losses. The choice among these means depends upon their cost to the farmer, and various conditions limiting the farmer's choice, such as size and organization of his farm, time-incidence of risk losses, availability of insurance programs, and the terms and arrangements under which he can get credit.

### *The Farmer's Action System*

The farmer's adaptation to income uncertainty proceeds within an "action system" or a "means-end schema." To disentangle the many interwoven aspects of the problem, let us examine the structure and the elements of the action system designed to meet uncertainty.

<sup>8</sup> One of the basic logical weaknesses in the application of marginal analysis to economic problems lies in the fact that "infinitesimal" changes on the margin do not produce behavior responses. Even completely rational behavior, therefore, represents a system of discontinuous functions, in which a quantity or price change has to be much larger than "infinitesimal" before it acts as a stimulus producing response. Enterprisers and consumers are not nearly as sensitive to the price mechanism (in allocating resources and income) as economists and politicians usually surmise.

*The End: Survival First, High Income Second*

The farmer's end is not simply to "maximize net income," as is usually assumed in analyses of the firm. Let us break down the general goal of income maximization into two more specific ones: (a) to assure the farmer's survival in case of heavy risk losses (whenever they might hit), and (b) to maximize income over time subject to (a). They are *not* coordinate; the survival end has priority over the maximization end. As in most cases where various ends are simultaneously pursued, they are in part complementary, in part conflicting. And where they are conflicting, the choice is not between one end or the other, but between a *higher degree of attainment of the one at the expense of a lower degree of attainment of the other.*<sup>9</sup>

This means in the practical behavior context of a Great Plains farmer, that he first braces himself against the eventuality of a heavy risk loss, and then maximizes his income; and that he is aware of the uncertainty, and that he acts rationally to keep his farm and family going.<sup>10</sup> The "gambling" of Plains farmers with prices and weather stems much more often from a lack of awareness of uncertainties, or an under-estimation of the size of the possible risk loss, than from a deliberate willingness to forfeit farm and home for the possible gain of a bumper crop salable at bonanza prices. Any "gambling" *after* survival of farm and home is reasonably well assured (in the farmer's mind) must be regarded as a means for serving the end of income maximization.

<sup>9</sup> In highly abstract terms, this relationship might be pictured by preference curves where the Y-axis represents the utility value of a *certain* income and the X-axis the absolute (nominal) value of the income (see Friedman and Savage, op. cit., p. 290) or by an indifference curve connecting the points where the *utility value of a certain income equals the absolute value of an uncertain income*. Such an indifference curve might indicate, for instance, that a farmer would feel equally well off with a *certain* income of \$3,000 as with an *uncertain* income of \$4,000 (of a specific expected probability). If such curves could be constructed from empirical measurements (which at the present time they cannot), we could determine the cost or income sacrifice farmers would be willing to bear in order to secure a *specific certain* income that would meet their survival end. However, the probability distributions of future incomes are not known, and the survival limits vary widely between farmers and for each farmer over time. But this should not discourage pioneering work along these lines.

<sup>10</sup> The action system for an inveterate gambler would be different. Even the legendary king, however, who gambled away his kingdom, presumably still retained his livelihood. Where a man gambles his life for a possible "risk gain," that gain is usually of an emotional nature, like fame or love, rather than monetary. A father would risk his life to save his son, while he would not risk it for a million dollars.



How can the "farm survival end" be defined in specific operational terms? For the sake of simple exposition, we might define it this way:

*To manage production, inventories, cash reserves and access to outside funds (through insurance and credit) so as to minimize the probability of a risk loss large enough to render the farmer insolvent.*

"Insolvent" means that total cash receipts fall short of meeting necessary production and living expenses, and debt and tax payments. We shall call the point where receipts just cover these necessary expenses and obligations the "survival limit." Note that the survival limit is not exclusively determined by production, costs, and prices, but also by family living requirements, debt and tax obligations.

### *The Means*

We have already outlined the three major categories of *means* available to the farmer to implement his survival end:<sup>11</sup>

1. *Flexibility in production, inventory and reserve management* which permits the shifting of resources from one product to another, the varying of input intensities and of inventories and cash reserves according to current revisions of expectations;
2. *Insurance programs* in which predetermined regular premium payments are budgeted *in advance* of risk losses for the purchase of indemnity claims to cover partly or wholly the risk losses when they are sustained; and
3. *Access to credit sources* at terms that will cover the critical part of the risk loss *after* it has occurred, and will allow the budgeting of repayments over a sufficiently long time period; to be effective, this requires more ample emergency credit during poor years, and a much greater time flexibility in the payment of any debt, tax, or other obligations than present credit arrangements provide.

These last two means are of an institutional nature. At any given time, they represent "conditions" beyond individual control in the framework of the farmer's action system. Over time, however, he can exert his influence upon these conditions, through par-

<sup>11</sup> We shall take here the neo-classical prescriptions for maximizing net income for granted and focus the discussion on the implementation of the survival end.

ticipation in group action for improving institutional arrangements, such as credit facilities, insurance programs, tax assessment and collection methods, price support programs, etc. Hence, we must add a fourth means to the structure of the farmer's action system:

4. *Participation in group action* to improve institutional arrangements designed to assist farmers in pursuing their survival and income ends.<sup>12</sup>

The inclusion of this means of group participation by the individual is necessary to keep the theoretical apparatus close to empirical reality. This holds especially in an era of rapid social change. In democratic countries, the *initiative* for changing institutions springs typically from widely scattered individuals, from enterprisers, workers, and consumers. In the individual's action system, his support of a certain group that is pressing for specific cooperative or legislative action represents a *means* designed to serve an end which he, as an individual, is pursuing. It can hardly be held that such means are so ineffectual that they can be neglected in the analysis of entrepreneurial problems. The enactment of price support legislation has changed the "condition" of prices quite materially, and such legislation would never have been enacted but for the active participation of hundreds of thousands of farmers, as individuals, in numerous gatherings on local, county, and state levels.

These four classes of means essentially comprise the full range of choices available to a Plains farmer for meeting the income uncertainties characteristic of the region. His problem is to apply each of them, in various combinations and in various degrees, in a pattern which is appropriate to (a) the different lines of production (crop and livestock enterprises), (b) the several kinds of financial requirements and obligations (production and living expenses, debts, and taxes), (c) the diverse types of uncertainties (like prices, weather, etc.), and (d) the existing institutional facilities (like credit arrangements, insurance programs, etc.).

### *The Conditions*

We are here specifically concerned with those conditions in the farmer's action system which are peculiarly characteristic of the

<sup>12</sup> See the article by Barber and Thair, "Institutional Methods of Meeting Weather Uncertainty in the Great Plains," in this issue.

Plains area and relevant to the problem of meeting uncertainty. *Crop and pasture yield fluctuations* represent the most outstanding source of income uncertainty in the Great Plains.

The economic difficulties in meeting yield uncertainties stem largely from the following characteristics:

1. It is the time incidence of poor years, rather than the amplitude of yield fluctuations, that create serious economic problems.<sup>13</sup> Low yields tend to bunch into sequences of two or more years in length, and so do high yields. This limits, for instance, the means of inventory and reserve management.
2. Whenever low yields occur, they are nearly universal within rather large areas, such as groups of counties, states, and sometimes even the region as a whole; so are high yields. This impedes, for instance, the development of crop insurance programs.
3. Yields of the various crops and pastures fluctuate fairly closely together. The years of poor wheat yields are usually also years of poor barley, oats, hay, and pasture yields. This restricts, for instance, the means of production flexibility through diversification.

The first of these characteristics has some fascinating theoretical implications. If the probabilities of yield expectations have a bi-modal distribution, the farmer is stymied in his decisions. If it is more likely that next year's yield is either very high or very low than somewhere in between, on what grounds can he choose his alternatives in planning?<sup>14</sup> If he acts on the unfavorable expectation he might as well give up and thus hope to minimize his risk loss. During the thirties many Plains farmers did, in fact, surrender deeds voluntarily, before they were bankrupt, on the basis of such extremely unfavorable expectations. If the farmer acts on the extremely favorable expectation, he will have vastly over-extended his obligations and suffered a much greater risk loss in the event of a poor year. This case, too, can be frequently observed in the Plains. The farmer will tend to *organize his operations so as to make for the*

<sup>13</sup> See R. Schickele, "Farm Business Survival under Extreme Weather Risks," this *Journal*, Nov., 1949, p. 933 ff.

<sup>14</sup> See Albert G. Hart, "Anticipation, Uncertainty, and Dynamic Planning," *Journal of Business of Univ. of Chicago*, Oct., 1940, p. 63: "An extreme dispersion of market contingencies, however—particularly if it is bi-modal, two radically different contingencies being more likely than anything in between—may simply be paralyzing."

*lowest possible critical limit with respect to yield at which he can survive.* If the mode of the unfavorable probabilities falls at or above this critical yield limit, he can proceed with his planning with sufficient decisiveness.

Price fluctuations create uncertainties throughout agriculture. Great Plains farmers, however, are peculiarly vulnerable on two counts. First, a major part of their income is derived from wheat sales, and prices of that crop vary substantially more than those of most livestock and livestock products.<sup>15</sup> Second, a larger proportion of total costs (including family living requirements) are fixed here than in most other major types of farming, a circumstance which restricts production flexibility on the intensive margin.

In the short-run, the existence or absence of a *crop insurance program* in a given county is a condition for the farmers there; agitation for crop insurance, however, is a means available to farmers in counties now outside the program, since farmers can press for their inclusion through group action.

Similarly, in the short-run the existing *credit facilities* and arrangements are a condition; but agitation for their improvement is a means in the farmer's action system under consideration.

We have now before us the major elements of the action system in which an individual Plains farmer (the *actor*) aims at surviving bad years (*survival end*) and at making the best possible living over the years (*income maximization end*). He is adapting his *means* to the inexorable uncertainties of weather and other causes of crop failures, to the less inexorable but still baffling uncertainties of price movements, and to the many technical and institutional limitations beyond his control (the *conditions*).

### *Some Practical Applications*

Here I can only outline in a rough way some analytical approaches that bear promise of yielding practical insights. Can we suggest some rather simple principles which Plains farmers may use as guides in the conduct of their affairs?

A farm family—any family—lives in the short-run. Mouths have to be fed every day, bills have to be met every month, taxes have to be paid every year. In face of great uncertainties, the farmer's

<sup>15</sup> See T. W. Schultz, *Production and Welfare of Agriculture*, Macmillan, N. Y., 1949, p. 78. Hog prices seem to be an exception, their variability being close to that of wheat.

first concern is survival in the short-run, of reducing the probability of a risk loss so heavy as to bankrupt him. Subject to the priority of this end, he will plan his operations for the highest net income in the long run.

To simplify the exposition, let us assume constant prices and costs, and deal with the condition most peculiar to the Great Plains: the uncertainty of yields.<sup>16</sup> How can a farmer best meet this uncertainty?

### *Importance of Farm Size*

For example, take two typical Northern Plains wheat farms: farm A with 320 acres, farm B with 1,280 acres. This range comprises the great majority of full-fledged family type wheat farms.<sup>17</sup> Assume that both farms have the same soil and weather, are operated by two families of nearly equal size and talents, and that the land alone would sell in the market for \$25 an acre. Eighty percent of the land is tillable, which leaves about 250 acres of cropland in farm A, 1,000 acres in B. Over the last 25 years (i.e., a generation), the wheat yield history on both farms is assumed as indicated in Table II.

From field surveys, we could construct a set of relevant budget data which would approximate fairly closely the asset structure, costs, and incomes of a typical farm in these two sizes. For these two models, then, the *constants* would be: soil type, climate, yield experience with uncertainty, product and factor prices, and family living requirements; the *dependent variable* disposable income; and the *independent variables* for each farm size would be costs and returns, factor combinations, financial obligations and various other means the farmer could employ in pursuit of his ends. By comparison of farms A and B, the effect of farm size, as an additional independent variable, upon disposable income and such crucial aspects as the "survival limit" can be evaluated. The focus of this inquiry is: upon what yield expectations does the farmer act, and what can he do to reduce to a minimum the probability of a fatal risk loss?

We might sketch the course of analysis by a simple set of hypo-

<sup>16</sup> Although most examples will be derived from grain farming, the principles involved apply essentially to extensive grazing as well. The general course of analysis outlined in the following pages can also be applied to price uncertainty.

<sup>17</sup> Three-quarters and one section farms represent a strong modal concentration in the main wheat areas of the region.

thetical data, as shown in Table I.<sup>18</sup> If these farms were to produce nothing but wheat, and if they were operated by unencumbered owners, the *survival limit* with respect to yield would be 12 bushels for farm A, and seven and one-tenth bushels for B. The 25-year average for both farms is 12 bushels. Hence, if these farmers plan their production on the basis of a yield anticipation according to

TABLE I. HYPOTHETICAL BUDGET DATA FOR TWO GRAIN FARM MODELS  
(Cost and prices constant, wheat price \$1.80 per bu.)

	Farm A	Farm B
Acres in farm	320	1,280
Acres in Wheat (representing all grains)	200	800
Land value at \$25 per acre	\$ 8,000	\$32,000
Value of all buildings	4,000	4,000
Value of land and buildings	\$12,000	\$36,000
Grain Enterprise:		
Receipts at 12 bu. yield	4,320	17,280
7 bu. yield	2,520	10,080
5 bu. yield	1,800	7,200
Cash production expenses	2,000	7,000
Property tax (\$1 per acre)	320	1,280
Net cash farm income		
At 12 bu. yield	2,000	9,000
7 bu. yield	200	1,800
5 bu. yield	— 520	—1,080
Necessary family living expense	2,000	2,000
Income available for saving or debt payments		
At 12 bu. yield	—	7,000
7 bu. yield	—1,800	— 200
5 bu. yield	—2,520	—3,080
For unencumbered owner:		
Survival limit with respect to gross income	\$ 4,320	10,280
Survival limit with respect to yield (bu.)	12.0	7.1

long-run experienced average yield, the *limit of tolerance* with respect to yield, in terms of deviation from the expectation, is zero for A, and 40 percent for B.

Later, we shall appraise several means which A and B might employ in safeguarding their survival. Before that, we should discuss how farmers might arrive at yield expectations.

<sup>18</sup> These data, of course, would require considerable refinement and backing by empirical evidence.



*Problems in Forming Yield Expectations*

A glance at Table II shows dramatically the difficulties a Plains farmer runs into when he wants to anticipate next year's yield.

TABLE II. WHEAT YIELD EXPERIENCE, 25 YEARS\*  
(Bushels per Seeded Acre)

Year	Bu. per acre	Year	Bu. per acre	Year	Bu. per acre	Year	Bu. per acre	Year	Bu. per acre
1	11	6	12	11	0	16	9	21	19
2	25	7	4	12	4	17	8	22	19
3	9	8	0	13	1	18	22	23	6
4	10	9	18	14	0	19	20	24	14
5	24	10	13	15	9	20	21	25	22

*Averages:*

1st 5 yrs.: 16 bu.	Last 10 yrs. in Yr. 10: 13 bu.	All 25 yrs.: 12 bu.
2nd 5 yrs.: 9 bu.	Last 10 yrs. in Yr. 15: 6 bu.	
3rd 5 yrs.: 3 bu.	Last 10 yrs. in Yr. 20: 9 bu.	
4th 5 yrs.: 16 bu.	Last 10 yrs. in Yr. 25: 16 bu.	
5th 5 yrs.: 16 bu.		

*Yield Distributions:*

	Yield range	Number of years	No. consecutive years
Low { 50% or less of 25 yr. average	0-6 bu.	7	2, 4, 1
51-75% of 25 yr. average	7-9 bu.	4	1, 3
Ave. 76-125% of 25 yr. average	10-15 bu.	5	1, 1, 1, 1, 1
High { 126-150% of 25 yr. average	16-18 bu.	1	1
151% or more of 25 yr. average	19-25 bu.	8	1, 1, 5, 1

*Frequency of Yield Succession: Number of Instances over 25 years:*

Low year succeeded by low year	7
Low year succeeded by ave. year	2
Low year succeeded by high year	2
Ave. year succeeded by low year	2
Ave. year succeeded by ave. year	0
Ave. year succeeded by high year	3
High year succeeded by low year	2
High year succeeded by ave. year	2
High year succeeded by high year	4

\* This is an actual yield history from 1924-48 of a farm in Montrail County, North Dakota, reported in an article by W. L. Cavert, "Long Term Wheat Yields on 6 North Dakota Farms." *N. Dak. Agr. Expt. Station Bimonthly Bul.* Vol. 11, No. 5, May-June 1949, p. 168.

Over a 25-year period—a time span really much too long for an individual over which to orient his year-to-year and even longer-run

production plans—a farm in northwestern North Dakota averaged a wheat yield of 12 bushels. But only during five of these 25 years did the yield fall within 25 percent of the average, between 10 and 15 bushels, and *none of these years were consecutive*. There were 11 years with yields of 25 percent or more below average (0–9 bu.) and nine of over 25 percent above average (16–25 bu.). Moreover, the lowest and the highest yields tended to *bunch together into periods of two or more consecutive years*. The yield distribution shows a definite tendency of bi-modal concentration near the extreme ends of the range, not only in frequency, but also in time sequence (bunching). *These characteristics of yield variation constitute the main source of economic difficulties in meeting yield uncertainty.*

At any given year, what yield can the farmer expect next year with the highest probability? Disconcerting as it may be, the long-time average yield seems to be the least likely. Five consecutive five-year averages vary between three and 16 bushels; four 10-year averages (overlapping) vary between six and 16 bushels, and practically the whole range of variations has been experienced within a period of four years (from the fifth to the eighth year).<sup>19</sup>

The tendency to bi-modal concentration near the extremes of the range suggests a thumb-rule principle, however, which may be of some practical usefulness. Once a year of high yield has occurred, the probability that the second year will be high also seems to be somewhat greater than that it will be low; as the number of consecutive high years increases, the probability of continuing high years decreases, and that of a period of low years increases. Over the 25-year history a high year was succeeded by a high one in four cases, a low year by a low one in seven cases. *In no case was an average year succeeded by an average one.* The experience of yield succession is summarized in Table II. We have, of course, no reason to assume that this quarter-century pattern is a typical "unit period" likely to be replicated in succeeding periods.<sup>20</sup>

<sup>19</sup> These characteristics, in connection with the relevant time-dimension for production and finance planning and with the crucial significance of the survival limit, render the standard statistical measures of frequency distribution of little value in the context of the farmer's action system. Even if yields over 1,000 years should show essentially normal randomness of distribution, probability theory could not give a farmer a practical guide in forming yield expectations for the next one or two years ahead, because the probability for a specific yield in any one year would be so small as to be of little value for decision making. For purposes of developing a crop insurance program, however, probability theory, and especially the theory of runs, might prove more and more useful as our data on weather and crop yields increase and improve.

<sup>20</sup> Yield history analyses of three other North Dakota farms reveal an essentially similar pattern of yield variation for the same 25-year period.

According to our thumb-rule, the expectation of a low yield would have materialized in seven of the 11 years in which he had low yields; in four years, his anticipations would have been wrong. That is not too good a batting average. Our thumb-rule in the high yield years is even less reliable. In the eight high years,<sup>21</sup> his expectation of a high yield next year would have come through in four years; in two it was followed by average yields, and in two by low ones. Still, with respect to his managerial plans, he might find it useful to combine the high and average classes of expectations, in which case they would have materialized in six of the eight years.

The farmer is in a real quandary in a year of average yield. Then, it seems more probable that next year's yield will be either high or low, than average. As has been pointed out by Hart, this is a specially paralyzing situation from the viewpoint of managerial planning. If he acts on the basis of a high yield expectation, his risk loss may be fatal; if he acts on a low yield anticipation, he may forfeit a high income opportunity.

I suggest that instead of trying to find an answer by arriving formally at specific yield expectations from year to year upon which to base managerial decisions, it might be more promising to *reduce as much as possible the lower limit of tolerance with respect to yields* for a given farm, without unreasonably forfeiting income opportunities in good years. That means a farmer might aim at arranging his production organization and financial structure so that *his income will remain above the survival limit at yields somewhere between 25 and 50 percent below the long-term average*. Then, whenever they fall below the tolerance limit, he will depend upon accumulated reserves, access to outside funds through insurance or credit, and flexibility in his expenditure requirements to carry himself through the poor years.

The question of formulating yield expectations with respect to the survival end would take this shape: (1) what is the lowest yield with which the farmer can squeeze through, and (2) what is the probability of the yield falling below this tolerance limit? If the most probable expectation of below critical yields is rather high, he can try to change his production organization and financial structure so as to reduce his "critical yield limit" sufficiently to keep the probability of yields falling below that limit down to a

<sup>21</sup> There were nine years with high yields, but since the last year had a high yield, that of the succeeding year is not known.

reasonably low expected frequency. In addition, he can plan for inventory and cash reserves, and for access to credit on flexible repayment terms to meet his needs in years of very low yields.

Let us pursue this course of action a little further by way of illustrations.

### *Manipulation of the Survival Limit*

Take farmer B in Table I. If he is an unencumbered owner, his survival limit with respect to yield is seven bushels, or 40 percent below his long-time yield average. In seven out of the 25 years of yield history, his yield fell below that critical limit (see Table II). The extent to which he could have pulled through these seven years by drawing upon indigenous reserves can readily be determined from the data presented. Much would depend on whether he started in a good or a poor period. Beginning in year one, he could perhaps have made it without changing his organization.

Farmer A is in a much more precarious situation. His critical yield limit is 12 bushels, that is right at the long-time average. Yields fell below that limit in 13 of the 25 years, and seven of these years came in succession. He could not pull through under his present organization. So what could he do?

Obviously, if he gets more land, he can move toward the position of farmer B. But suppose he cannot get hold of more land. Here are a few possibilities:

(1) *Subsistence enterprises*, through fuller utilization of underemployed resources, might raise his income and lower his expenses. Seventy acres of hay and pasture land are not utilized at all. They might support, say, two to three cows with replacement stock and a few steers or sheep. Since his family labor is also underemployed, he might add a flock of chickens that could utilize feed otherwise going to waste. This would reduce his family living expenses by cutting down the grocery bill, and might even bring in a little cash during flush season.

Here lies the economic significance of subsistence enterprises on smaller farms of the Plains. If they can reduce living expenses by, say, \$600, and increase net cash receipts by, say, \$320, the *tolerance limit of farmer A is lowered from 12 to nine bushels*. That lessens the number of years with yields below the critical limit from 13 to eight years. From a strictly commercial point of view, these subsistence enterprises look very "inefficient." As long as they do not

withdraw resources from the major enterprises, hence reduce their returns, they can be highly effective in lowering the critical yield limit on the smaller farms.<sup>22</sup> If market location and managerial capacity permit, this farmer might expand one of his livestock enterprises further with increased purchases of feed to an efficient commercial scale which would again improve his chance of survival.

(2) Another means of increasing labor and equipment utilization on a small farm is *custom work* on other farms. If farmer A can expect a net receipt of, say, \$600 from plowing or combining for neighbors, this would reduce his critical limit further from nine to seven or eight bushels per acre.

The principle should be clear enough to need no further elaboration. The same yield series makes it possible for farmer B to operate a strictly cash grain system in a majority of years well above the survival limit. In contrast, farmer A must expect his grain enterprise to bring incomes much below the survival limit in many a year, hence must seek additional sources of income through fuller utilization of fixed factors, intensification, or off-farm work. Even relatively small increases in income and reduction in expenses can reduce his critical yield limit substantially, and thus increase his chance of survival.

### *Problems of Capital Financing*

Apart from production organization, the survival limit is also determined by the degree of encumbrance. Our models can readily be expanded to trace the effect of debt (or rent or tax) obligations upon the survival limit.

At a 12 bushel yield, farmer A has no savings from his grain enterprise to use for capital expansion, while B has \$7,000 left after production, necessary living expenses and property taxes (see Table I). He can buy more land, or accumulate cash reserves for bad years, or increase his living level.

But it is farmer A who is in dire need of additional resources, and who is in the weakest position for securing them. Except in very good years, he depends largely on credit or on renting for access to more resources.

<sup>22</sup> This is *not* an example of a "subsistence farm," since in 17 out of 25 years this farm provides *at least* the family's living requirements, and in many years, substantially more. Families on farms too small to meet decent living standards in a majority of years should be helped to find better opportunities elsewhere, or obtain more land.

The long-time average rate of saving or capital accumulation is obviously low on farm A. Even at a yield of 16 bushels (33 percent above average), the possible saving rate is only \$1,440; and since there are many years with yields below the critical limit, liquidation of assets accumulated during good years is often necessary just to meet production and living expenses in poor years.

Debt payments due each year directly raise the critical limit with respect to yield, hence increase the number of years when yields fall below that limit. But farmer A desperately needs more resources in order to lower this limit. He has to go into debt for more resources which *initially* raises the critical yield limit and makes him correspondingly more vulnerable. He is, indeed, in a tough spot. The solution lies in long-time amortized loans (even for production purposes) with prepayment and deferment privileges on principal and interest.<sup>23</sup>

A systematic exploration of the relationships between yields and survival limits, of the factors determining the critical limits, and of the role they play in the action system of Plains farmers, should be a most promising undertaking.

The task of meeting the uncertainties of Plains farming is so great that we should bend every effort toward developing and expanding the effectiveness of each of these various means that have been outlined here. Without such individual and collective effort, the future of the Great Plains may hold frustrating insecurity and poverty for family farmers, instead of vigorous progress in building a stable rural economy and culture.

<sup>23</sup> See the forthcoming report of the North Central Tenure Committee on improving land credit arrangements, to be published as a Regional Bulletin by the Indiana Agricultural Experiment Station.



# STABILIZING FARMING BY SHIFTING WHEAT LAND TO GRASS IN THE NORTHERN GREAT PLAINS

With Particular Emphasis on Annual Effects

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## *Introduction*

AGRICULTURAL production and income vary greatly in the dry-land areas of the northern Great Plains. Drouths often cause low yields and sometimes complete crop failures. The development of a system of farming capable of stabilizing and bolstering farm income against such hazards has long been a problem faced by farmers and agricultural technicians. With the favorable precipitation of the last decade, many people are now inclined to minimize the climatic limitations of the area. On the other hand, past experience should indicate that stable farming systems on dry land cannot be based on the favorable precipitation which prevailed during the forties. The problem of alleviating or preventing agricultural distress in the Northern Plains, such as that caused by the drouth of the thirties, by adjustments in farming systems, merits serious consideration.

Several million acres of virgin range and former cropland in different stages of vegetative recovery were broken and seeded to wheat during the forties when weather conditions were favorable and demand for wheat expanded. Future agricultural adjustment programs will probably call for the retirement of a portion of the land now in wheat. The chief alternative use for this land is permanent or rotation grass for use as pasture and hay for livestock, and to a more limited extent for commercial grass seed.

Wheat and livestock are both important sources of income on many operating units in the Northern Great Plains. Wheat land is often adjacent to, or interspersed with, range land. Although there are scatterings of high grade wheat land in this area, much of it would not be considered as number one quality. In such sections livestock frequently offers good possibilities of bolstering and stabi-

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lizing agriculture against the ruinous effects of prolonged dry weather as well as against lower wheat prices. But to take full advantage of this alternative many farmers need more forage and pasture.

The economic effects of replacing wheat with crested wheat grass on farms in the Great Plains, particularly in southwestern North Dakota, are explored in this paper. Crested wheat grass is well adapted to the region. It withstands grazing well and provides grass early in spring and in fall when most needed to supplement native range. It is also resistant to drouth and cold.

#### *Average Effects of Adding Crested Wheat*

The average effects of shifting land from wheat to crested wheat grass on a wheat-cattle ranch, representative of southwestern North Dakota, are shown by the farm budgets in Table I.

The operator of this ranch has already seeded 90 acres of his wheat land to crested wheat grass. In addition to showing the organization and income possibilities under both the former and present systems, this table also includes an alternative ranch plan in which the entire 280 acres of wheat land is seeded to crested wheat grass. These budgets, along with others showing the details of year-to-year changes in reorganization, expenses, and income necessary in changing from the former to the present and the alternative plan, were included in the Western Section of USDA Miscellaneous Publication 702. This progress report entitled "Will More Forage Pay?—Economic Aspects of Using More Forage on Farms" covered the first year's activities on a nation-wide study of the opportunities for the profitable use of more grass and legumes in farming systems. However, in Table I as well as elsewhere in this paper net cash income under the high price level was calculated on the basis of a parity ratio of 100 with an index of 200 for both prices paid and received. This is somewhat less favorable but more realistic than the 1942-46 price and cost levels used in Miscellaneous Publication 702. Because of wartime price controls and the need for expanding agricultural production, prices received were relatively higher than those paid by farmers.

Slight increases in net cash income are indicated under both the present plan and the alternative as compared with the former (Table I). Because grass is less subject than wheat to the hazards of drouth, a shift in the direction of more grass and the storage of

TABLE I. EFFECTS OF PERMANENT SEEDING OF WHEAT LAND TO CRESTED WHEAT GRASS ON THE ORGANIZATION, PRODUCTION, AND INCOME OF A WHEAT-CATTLE RANCH IN SOUTHWESTER NORTH DAKOTA

Item	Former Plan		Present Plan		Alternative Plan	
	Acres	Pro- duction	90 acres wheat and summer- fallow land seeded to crested wheat grass		All wheat and summer-fallow land seeded to crested wheat grass	
			Acres	Pro- duction	Acres	Pro- duction
	<i>Bushels</i>		<i>Bushels</i>		<i>Bushels</i>	
Crops and land use						
Wheat	140 <sup>a</sup>	1,526	95 <sup>b</sup>	1,140	—	—
Summer-fallow	140	—	95	—	—	—
Corn	90	1,800	90	1,800	90	1,800
Oats	50	1,750	50	1,750	50	1,750
Barley	40	1,000	40	1,000	40	1,000
	<i>Tons</i>		<i>Tons</i>		<i>Tons</i>	
Wild hay	300	100	300	100	300	100
Crested wheat grass hay	—	—	10	9	32	35
	<i>AUM'S<sup>c</sup></i>		<i>AUM'S<sup>c</sup></i>		<i>AUM'S<sup>c</sup></i>	
Private range	600	240	600	240	600	240
Crested wheat grass pasture	—	—	80	115	248	449
Crested wheat grass aftermath	—	—	—	5	—	16
Grazing permits held	—	1,080	—	1,080	—	1,080
Total	1,360	—	1,360	—	1,360	—
	<i>Inventory number</i>	<i>No. sold</i>	<i>Inventory number</i>	<i>No. sold</i>	<i>Inventory number</i>	<i>No sold</i>
Livestock						
Cows	92	12	100	13	126	16
Heifers 2 yrs. (replacements)	15	—	16	—	20	—
Yearlings, heifers and steers	78	60	85	66	107	84
Bulls	3	—	3	—	4	—
Horses	4	—	4	—	4	—
Hens	50	—	60	—	50	—
	<i>Dollars</i>		<i>Dollars</i>		<i>Dollars</i>	
Net cash income						
With high price level <sup>d</sup>	6,293		6,420		6,500	

<sup>a</sup> Wheat yield—7 bushels per acre on 60 acres, 12 bushels on remainder of wheat land.

<sup>b</sup> Wheat yield—12 bushels per acre.

<sup>c</sup> Animals unit months of grazing.

<sup>d</sup> Based on a parity ratio of 100, with an index of 200 for both prices paid and received.

high-quality hay as a feed reserve would appear to reduce risk and give greater stability to income. It is recognized that most farmers would not be inclined to shift their entire wheat acreage to grass. The alternative plan was developed as an extreme example partly because the operator of this unit expects eventually to shift his entire acreage of wheat to crested wheat grass and partly to furnish a guide to those who would find it profitable to operate somewhere between these two extremes.

Some sacrifice in income is to be expected, however, during the three or four years which are required to establish stands of crested wheat grass and to build up the necessary numbers of breeding stock to utilize the increased acreage of grass. During these intervening years the net cash income is likely to be less than under the former plan. These temporary reductions in income are caused by holding back from market more cows and breeding heifers to build up breeding cow numbers, and by purchasing some additional feed needed by increased livestock numbers before the crested wheat grass is in full production. Additional cash expenses also are incurred during this period. Crested wheat grass seed, which is drilled in wheat stubble or summer-fallow during the fall, must be purchased. Another bull must be added to service the additional cows.

An examination of the three farm situations shown in Table I indicates that operators of wheat-cattle ranches in this or comparable areas in the Northern Plains can shift wheatland to grass with very little change in income. However, precipitation varies greatly in the Plains and farm production in any one year may be well above or below average. Low yields are frequent and complete crop failures often happen. Moreover, in this region, years of sufficient and insufficient rainfall do not generally occur randomly; they tend to be grouped in a series similar to the drouth of the thirties, followed by a run of years of ample rainfall such as the forties, with no predictable sequence.

Several years may be required to rebuild depleted livestock herds after a drouth. Hence, during those years immediately following one or more arid ones, even though range production is again average or above, cattle numbers and sales may be below. For these reasons, in addition to budgets demonstrating farm performance under average conditions, information as to the effect of variations in weather on annual production, organization, and income is apparently needed in appraising alternative systems.

Farmers who today adopt changes similar to those shown in Table I may not face average conditions for several years. They may encounter either a period of severe drouth and below-average yields similar to the thirties, or a continuance of the favorable precipitation of the forties with above-average yields, neither of which approaches the average conditions.

#### *Year-by-Year Effects of Adding Crested Wheat*

One method of determining the annual and cumulative effect of varying precipitation on farm organization and income for different farming systems is to develop a series of annual budgets, in which crop and range production are varied in accordance with actual conditions as they existed in the past. This method is used here to show the relative effects of such shifts over a 14-year period on both the former and the alternative system for the southwestern North Dakota wheat-cattle ranch. Because crop and range production were varied annually in accordance with actual county yields, these budgets reflect changes in organization, production, and income which might have been expected during the years 1929 to 1942. During 1929-42 precipitation averaged 14.55 inches, less than an inch below the 35-year average (1914-48). In the thirties, only in 1930 and 1932 was precipitation above the 35-year average. On the other hand, during the forties annual precipitation was well above the long-time average.

In 1929, the beginning year of the series, crop and range production on this farm closely approximated normal or average conditions. Inasmuch as livestock organization must be adjusted to crop and range production, average livestock numbers were carried for that year. Normal carry-over of feed reserves amounted to 100 tons of hay under the former and 135 under the alternative plan, with 1,000 bushels of barley carried over under both systems. In addition to the high price level shown in the average budgets (Table I), the annual budgets were also calculated on the basis of actual prices and costs which prevailed during each year.<sup>1</sup>

The year-to-year effect of drouth or favorable precipitation on crop and range production and livestock numbers under both the former and alternative systems are shown in Tables II and III. In order to utilize the additional acreage of grass, breeding cow

<sup>1</sup> For a discussion of the methodology, procedure, and price levels used in the study from which this phase has been expanded see pp. 14 and 15 of "Will More Forage Pay?—Economic Aspects of Using More Pasture and Forage on Farms."

TABLE II. ANNUAL EFFECTS OF VARIATIONS IN CLIMATE ON THE ORGANIZATION AND PRODUCTION OF A WHEAT-CATTLE RANCH IN SOUTHWESTERN NORTH DAKOTA UNDER THE FORMER SYSTEM, 1929-42

Item	Acres	Production													
		1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
Bushels															
Cropland	140	1,428	1,540	364	2,072	630	28 <sup>a</sup>	70 <sup>a</sup>	14 <sup>a</sup>	378	238	2,114	1,634	2,856	3,458
Wheat	140	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Summer-fallow	90	225	1,566	1,827	1,890	1,395	171	1,368	63	981	1,458	1,953	2,313	2,025	2,115
Corn	50	1,425	975	290	2,000	775	10 <sup>a</sup>	615	530	510	530	2,615	1,435	2,505	3,780
Oats	40	856	896	240	1,596	372	8 <sup>a</sup>	736	4	248	24	1,264	912	1,592	1,736
Barley															
Tons															
Wild hay	300	123	63	42	105	63	63	75	72	69	87	117	102	117	162
AUM'S <sup>b</sup>															
Grazing land	600	252	252	215	262	222	154	218	157	185	243	258	268	283	289
Private															
Public		1,135	1,135	969	1,177	997	692	983	706	831	1,094	1,163	1,204	1,273	1,301
Total	1,360														
Number															
Cattle															
Inventory, January 1		92	92	92	92	92	68	46	52	50	65	73	81	92	92
Cows															
Heifers 2 yrs.															
(Replacements)															
Yearlings	15	15	15	15	15	15	15	8	—	18	10	10	15	15	15
Calves born	78	78	78	78	78	78	78	—	39	44	43	55	62	69	78
Calves born	78	78	78	78	78	78	58	39	44	43	55	62	69	78	78
Bulls	3	3	3	3	3	3	3	—	2	2	2	2	3	3	3
Annual sales															
Cows	12	12	12	12	12	36	35	0	0	1	0	0	1	12	12
Others	60	60	60	60	60	60	125	0	19	32	31	38	45	52	60

\* Cut for hay. Production listed in tons.

<sup>b</sup> Animal unit months of grazing.

TABLE III. ANNUAL EFFECTS OF VARIATIONS IN CLIMATE ON THE ORGANIZATION AND PRODUCTION OF A WHEAT-CATTLE RANCH IN SOUTHWESTERN NORTH DAKOTA UNDER THE ALTERNATIVE SYSTEM, 1929-42



TABLE III. ANNUAL EFFECTS OF VARIATIONS IN CLIMATE ON THE ORGANIZATION AND PRODUCTION OF A WHEAT-CATTLE RANCH IN SOUTHWESTERN NORTH DAKOTA UNDER THE ALTERNATIVE SYSTEM, 1929-42

SHIFTING WHEAT LAND TO GRASS

381

Item	Acres	Production													
		1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
<i>Bushels</i>															
Cropland	90	2,025	1,566	1,827	1,890	1,395	171	1,368	63	981	1,458	1,953	2,313	2,025	2,115
Corn	50	1,425	975	290	2,000	775 <sup>a</sup>	10	615	530	510	530	2,615	1,435	2,505	3,780
Oats	40	856	896	240	1,596	372 <sup>a</sup>	8	376 <sup>a</sup>	4	248	224	1,264	912	1,532	1,736
Barley								<i>Tons</i>							
Wild hay	300	123	63	42	105	63	63	75	72	69	87	117	102	117	162
Crested wheat grass hay	32	44	30	24	40	16	16	34	8	28	36	44	38	17	52
								<i>AUM'S<sup>b</sup></i>							
Grazing land	600	252	252	215	262	222	154	218	157	185	243	258	268	283	289
Private		1,135	1,135	969	1,177	987	692	983	706	831	1,094	1,163	1,204	1,273	1,301
Public															
Crested wheat grass pasture	248	472	472	403	489	414	288	409	294	345	455	484	501	529	541
Crested wheat grass hay aftermath		17	17	14	17	15	10	15	10	12	16	17	18	19	19
Total	1,360														
<i>Number</i>															
Cattle															
Inventory, January 1		126	126	126	126	126	99	63	71	69	87	104	121	126	126
Cows															
Heifers, 2 yrs. (Replacements)		20	20	20	20	20	20	10	0	20	29	20	25	20	20
Yearlings		107	107	107	107	107	107	0	54	60	59	74	84	103	107
Calves born		107	107	107	107	107	84	54	60	59	74	88	103	107	107
Bulls		4	4	4	4	4	4	0	2	2	3	4	4	4	4
Annual sales															
Cows		16	16	16	16	43	53	0	0	0	9	0	16	16	16
Others		84	84	84	84	84	182	0	32	29	37	47	65	80	84

<sup>a</sup> Cut for hay. Production listed in tons.

<sup>b</sup> Animal unit months of grazing.

numbers were increased from 92 under the former to 126 head under the alternative system.

Because of severe drouth during the years 1933 and 1934, breeding cows were reduced about 50 percent under both systems. By 1934 the drouth had become so acute that in addition to selling breeding cows, it was necessary to dispose of that year's entire spring calf crop and the herd sires. Only half as many two-year old heifers as formerly were retained for replacement purposes. It was not until 1941 that breeding cow numbers were restored to normal; and cattle sales did not approach average proportions until 1942.

Based on actual county yields and range conditions reported, the conclusion is that wheat crops of 1934, 1935, and 1936 were total failures except for a small amount cut for hay; whereas an average annual production of 19 tons of hay and 342 AUM's of grazing could have been expected during these three years from the 280 acres of wheat land shifted to crested wheat grass. During the remaining 11 years of the 1929-42 period, there were four additional years when the annual wheat production was 630 bushels or less, three years when the production ranged from 1,000 to 2,000 bushels, three when it varied between 2,000 and 3,000, and one year when 3,458 bushels were harvested. Annual yields of wheat and barley were less than 50 percent of the 14-year average in seven years, or half the entire period. Oat yields were less than 50 percent of the average in six years. But in only one year was the yield of hay less than 50 percent of the 14-year average, and annual range production as indicated by range condition reports was at least 50 percent of the 14-year average throughout the entire period. Average yield of wheat during the 1929-42 period was about 22 percent, feed grains around 20 percent and sales of beef from 15 to 16 percent less than the long-time estimates used in developing the average budgets shown in Table I.

One of the difficulties inherent in livestock enterprises in this area is the impracticability of utilizing to the fullest extent each year's production of grass. The year 1935, although a favorable year for grass, was preceded by two years of drouth which had made it necessary to liquidate large numbers of cattle. Consequently, less than 50 percent of the grass produced in 1935 was actually converted to beef. With the exception of 1931 and the severe drouth years of 1933 and 1934, less grass was consumed than was produced.

In the average farm plans portrayed in Table I, yearlings were grazed for six months and sold at weights averaging 650 pounds for heifers and 700 pounds for steers. In the drouth year of 1933, only enough grass was available to supply the yearlings with a five-month grazing period. In 1934 but four months' grazing was available. During 1931 there was only sufficient grass for a five-month season. During these two years it was also necessary to lengthen the winter feeding period for breeding cows and young stock. A longer pasturage season was provided with the addition of crested wheat grass, which supplies early spring grazing. During the remaining years of this period yearlings were carried on grass until November 15, a 7½-month grazing period, and there was a surplus of unused grass at the end of the season. It was estimated that during the 14-year period actual selling weights of all yearlings ranged from 560 to 768 pounds. During years when there was a surplus of grass, average selling weights were 718 pounds for heifers and 768 pounds for steers.

The need for analysis beyond that provided by longtime average budgets shown in Table I may be observed by comparing them with the 1929-42 averages in Tables II and III. Although the period 1929-42 included 14 crop years, the average annual production during this period was significantly less than the estimated longtime production averages used in developing the budgets shown in Table I.

Comparative returns under each system are shown in Tables IV and V. The estimated income residuals shown in Table IV are based on varying annual prices and costs actually received and paid by farmers during the 14-year period. Table V is included to compare the former and alternative systems, assuming a constant high price level. A comparison of Tables I and V also provides an estimate of the income to be expected from each system with the same price level but with production based, on the one hand, upon long-time average yields (Table I), and, on the other, upon annual yields reported during the period 1929-42 (Table V).

During the 14-year period, although annual income and production varied widely under both systems, the former varied less under the alternative plan. With actual prices during this period, net cash income averaged \$2,048 with the former and \$2,144 with the alternative system (Table IV). Under the former plan annual net cash income ranged from a deficit of \$1,797 to a net cash income of \$9,444, with four consecutive years in which cash expenses ex-

ceeded cash income. Under the alternative system income ranged from a deficit of \$1,743 to a net cash income of \$7,755, with only two years in which cash expenses exceeded cash receipts. (Table IV).

After deducting estimated expenses for family living and depreciation from net cash income, there would have been nine years under the former and eight years under the alternative system when family living costs and depreciation exceeded net cash income. This residual identified here as "income for savings and debt payments" reflects that portion of the annual income a ranch family would have left for payments on debts and income tax,

TABLE IV. ANNUAL EFFECTS OF CLIMATIC VARIATIONS ON INCOME OF A WHEAT-CATTLE RANCH IN SOUTHWESTERN NORTH DAKOTA UNDER THE FORMER AND ALTERNATIVE SYSTEMS WITH ACTUAL PRICES

Year	Gross cash income		Cash expenses		Net cash income		Income for savings or debt payments <sup>a</sup>	
	Former	Alternative	Former	Alternative	Former	Alternative	Former	Alternative
1929	\$7,954	\$8,090	\$2,995	\$2,760	\$4,959	\$5,331	\$2,509	\$2,881
1930	6,362	6,382	2,794	2,562	3,568	3,820	1,249	1,501
1931	2,955	3,735	2,554	2,236	401	1,499	-1,590	-492
1932	3,663	3,286	2,315	2,109	1,348	1,177	-326	-497
1933	2,920	3,240	2,091	1,944	829	1,296	-545	-378
1934	3,458	4,989	1,954	2,421	1,524	2,568	-371	673
1935	490	272	2,287	2,015	-1,797	-1,745	-3,727	-3,673
1936	1,077	1,769	1,722	1,598	-645	171	-2,571	-1,755
1937	2,503	1,840	2,514	2,270	-211	-430	-2,231	-2,450
1938	1,830	2,472	2,125	2,211	-295	261	-2,197	-1,641
1939	4,440	2,951	2,734	2,252	1,706	699	-165	-1,172
1940	4,699	4,783	2,475	2,264	2,224	2,519	325	660
1941	8,506	7,738	2,891	2,638	5,615	5,100	3,582	3,067
1942	13,037	10,985	3,593	3,230	9,444	7,755	7,058	5,369
Average	4,550	4,460	2,502	2,322	2,048	2,144	50	147

<sup>a</sup> Net cash income adjusted by subtracting estimated costs for depreciation and family living. Annual living costs based on estimated \$2,400 in 1942-46, adjusted by index numbers of prices paid by farmers for all commodities bought for use in family maintenance, *Agricultural Statistics, 1948*, Table 667.

additional ranch investments, building up operating and cash reserves, after paying for a stable, reasonably adequate level of family living. Annual revenue for savings or debt payments, although extremely low under both systems, averaged three times as high under the alternative. However, income varied greatly under both systems, from \$7,058 in 1942 to a deficit of \$3,727 in 1935 under the former, and from \$5,369 to a deficit of \$3,673 under the alternative system (Table IV).

Largely because of decreasing prices, low crop yields, and the heavy sales of breeding stock during drouth years, neither system

would have provided any accumulated income toward savings or debt payments from 1931 to 1939. A rancher who began operations in 1929 would have required reserves either from savings or loans of \$10,265 under the former and \$7,003 under the alternative system, to maintain an adequate family living and to set aside a reasonable amount for depreciation. As illustrated in Table VI, under the former system accumulated income for savings or debt payments reached a total of \$3,758 in 1930, followed by an accumulated deficit of \$10,265 by the end of 1939 and a surplus of \$700 in 1942. Under the alternative system, a total of \$4,382 was reached in 1930, to be followed nine years later by a deficit of \$7,003 and in 1942 by a surplus of \$2,053. Accumulated savings at the end

TABLE V. ANNUAL EFFECTS OF CLIMATIC VARIATIONS ON INCOME OF A WHEAT-CATTLE RANCH IN SOUTHWESTERN NORTH DAKOTA UNDER THE FORMER AND ALTERNATIVE SYSTEMS WITH HIGH PRICES

Year	Gross cash income		Cash expenses		Net cash income		Income for savings <sup>a</sup> or debt payments	
	Former	Alternative	Former	Alternative	Former	Alternative	Former	Alternative
1929	\$10,644	\$10,757	\$4,072	\$3,753	\$6,572	\$7,004	\$3,807	\$4,239
1930	10,134	10,044	3,963	3,634	6,171	6,410	3,406	3,645
1931	6,820	8,547	4,149	3,631	2,671	4,916	— 94	2,151
1932	12,224	10,762	4,248	3,869	7,976	6,893	5,211	4,128
1933	9,765	11,312	3,873	3,601	5,892	7,711	3,127	4,946
1934	10,509	15,163	3,141	3,933	7,368	11,230	4,603	8,465
1935	715	397	3,600	3,173	-2,885	-2,776	-5,650	-5,541
1936	1,944	3,194	2,755	2,557	— 811	637	-3,576	-2,128
1937	3,627	2,967	3,696	3,337	— 69	- 370	-2,834	-3,135
1938	3,452	4,578	3,400	3,537	52	1,041	-2,713	-1,724
1939	9,303	5,792	4,479	3,688	4,824	2,104	2,059	— 661
1940	8,903	9,169	3,993	3,653	5,000	5,516	2,235	2,751
1941	13,425	11,677	4,410	4,024	9,015	7,653	6,250	4,888
1942	16,390	13,080	4,823	4,336	11,567	8,744	8,802	5,979
Average	8,425	8,388	3,900	3,623	4,525	4,765	1,760	2,000

<sup>a</sup> Net cash income adjusted by subtracting estimated costs for depreciation, and family living. Annual family living costs estimated at \$2,400 annually.

of the fourteenth year would have been higher by \$1,353, or 193 percent, under the alternative system (Table VI).

On the other hand, the financial position of the operator of such a ranch would have been much better throughout the 14-year period had it been possible to operate under the constant price level (Tables IV and V). Although cash expenses would have averaged about 56 percent higher, net cash receipts would have averaged in the neighborhood of 120 percent higher. Income available for savings or debt payments would have averaged from \$1,710 to \$1,853 higher under the constant price level (Table V).

*Effects of Different Levels of Precipitation*

Table VII illustrates the variation in income under both systems during periods of good and poor climatic conditions when income for savings or debt payments was above or below the average shown in Table I. In addition to enabling the operator to lay away financial and feed reserves in years of favorable precipitation, desirable systems of farming should stabilize and provide as much cash income as possible during drouth periods. In this area, a terrific strain is placed on farm solvency during dry years. In many in-

TABLE VI. ANNUAL ACCUMULATIONS AVAILABLE FOR SAVINGS OR DEBT PAYMENT ON A WHEAT-CATTLE RANCH IN SOUTHWESTERN NORTH DAKOTA UNDER THE FORMER AND ALTERNATIVE SYSTEMS WITH ACTUAL AND HIGH PRICES<sup>a</sup>

Year	Former Plan—Before seeding wheat and summer-fallow land to crested wheat grass		Alternative Plan—All wheat and summer fallow land seeded to crested wheat grass	
	Actual price level	High price level	Actual price level	High price level
1929	\$ 2,509	\$ 3,807	\$2,881	\$ 4,239
1930	3,758	7,213	4,382	7,884
1931	2,168	7,119	3,890	10,035
1932	1,842	12,330	3,393	14,163
1933	997	15,457	3,015	19,109
1934	626	20,060	3,688	27,574
1935	— 3,101	14,410	15	22,033
1936	— 5,672	10,834	—1,740	19,905
1937	— 7,903	8,000	—4,190	16,770
1938	—10,100	5,287	—5,831	15,046
1939	—10,265	7,346	—7,003	14,385
1940	— 9,940	9,581	—6,383	17,136
1941	— 6,358	15,831	—3,176	22,024
1942	700	24,633	2,053	28,003

<sup>a</sup> Annual accumulations after deducting estimated family living costs and depreciation from net cash income. Annual living costs based on estimated \$2,400 in 1942-46, adjusted by index numbers of prices paid by farmers for all commodities bought for use in family maintenance. *Agricultural Statistics, 1948*, table 667.

stances, accumulated savings, reserves of feed, and livestock inventories which expanded in more favorable years, become seriously if not totally depleted in an extended drouth period. Throughout such periods any increase in income, however small, aids in alleviating distress and provides some of the absolute necessities of family living. During periods of drouth and low prices, many farmers resort to milking cows normally kept for production of beef. Other farmers, who are already milking some "red cows," will increase the number milked. Although the returns from milking these cows



are small, the income helps to provide some of the necessities of family living and to meet a portion of the more urgent cash expenses at a time when cash receipts are extremely small.

Throughout the periods 1929-32, and 1933-38, income for savings or debt payments averaged higher under the alternative than under the former system, a relationship similar to that prevailing in the average budget. However, chiefly because of the extremely favorable moisture conditions which resulted in exceptionally high wheat yields, income under the former plan during the period 1939-42 was significantly higher than under the alternative system (Table VII).

TABLE VII. EFFECTS OF PERMANENT SEEDING OF WHEAT LAND TO CRESTED WHEAT GRASS IN STABILIZING INCOME ON A WHEAT-CATTLE RANCH, SOUTHWESTERN NORTH DAKOTA, BY PERIODS, 1929-42.

Period	Average annual income for savings on debt payments <sup>a</sup>			
	Actual price level		High price level	
	Former plan	Alternative plan	Former plan	Alternative plan
1929-42	\$ 50	\$ 147	\$1,760	\$2,000
1929-32	460	848	3,082	3,541
1933-38	-1,990	-1,537	-1,174	149
1939-42	2,700	1,971	4,836	3,239

<sup>a</sup> Average annual income after deducting estimated family living costs and depreciation from net cash income.

Crop and range production varied considerably from period to period. Wheat yields averaged 8.5 bushels per acre from 1929 to 1942. Both precipitation and prices were favorable throughout 1939-42 when wheat averaged 18 bushels per acre. During the period 1929-32 when wheat yielded 9.6 bushels, rainfall, although not as favorable as in the years 1939-42, was much above the drouth period of 1933-38 when mean production was less than 1.5 bushels per acre (Table VIII).

Inasmuch as crop and grass production closely approached average in 1929-32 period, livestock numbers kept and sold were the same as the average budgets shown in Table I. During the period 1929-32, under actual prices, income for savings or debt payments would have increased from \$460 under the former to \$848 under the alternative system.

Both farm production and prices were extremely low during the

drouth years of 1933-38. Throughout this period wheat averaged only 1.5 bushels, corn 10.1, oats 9.9 and barley 6.6 bushels. Native hay averaged .24 ton per acre (Table VIII). Throughout the period 1933-38, cattle numbers averaged 34 percent less under both systems and yearling sales were 43 percent lower under the former and 45 percent lower under the alternative plan than during the more normal period of 1929-42. During this period, sales of grain would have decreased from \$243 to \$49 while beef sales would have increased \$583 or 34 percent in shifting from the former to the alternative system. After deducting family living and depreciation costs from net cash income there would have been actual deficits

TABLE VIII. AVERAGE CROP YIELDS ON A WHEAT-CATTLE RANCH, SOUTHWESTERN NORTH DAKOTA, BY PERIODS, 1929-42.

Period	Wheat	Corn	Oats	Barley	Native hay
	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Tons</i>
1929-42	8.5	16.8	25.7	19.0	.30
1929-32	9.6	20.3	23.3	22.4	.28
1933-38	1.5	10.1	9.9	6.6	.24
1939-42	18.0	23.4	51.7	34.0	.41

under both systems. However, the deficit under the alternative would have been \$453 or 23 percent less than under the former system. On the other hand, under the higher price level, there would have been an actual deficit of \$1,174 with the former, compared to an income for savings or debt payments of \$149 with the alternative system. This reflects the importance of livestock in stabilizing farm income in poor years. Even though it may be necessary to liquidate a large proportion of the herd in periods of prolonged drouth, livestock provides the farmer with a reserve fund to meet current farm operating and family living costs during years of crop failures. Throughout the drouth period 1933-38, almost all of the cash receipts for both systems were from livestock sales.

Because of favorable precipitation, crop yields were unusually high during the period 1939-42. Although range productivity averaged higher in 1939-42 than in the period 1929-32, actual livestock numbers were less, due to the difficulty of expanding a drouth-depleted herd. During the 1939-42 period the breeding cow herd under the former system averaged 91 percent and under the alternative 94 percent of the 1929-32 inventory. The number of yearlings sold in the 1939-42 period under the former system aver-

aged 80 percent and under the alternative system 82 percent of the 1929-32 sales. Income available for savings or debt payments decreased 729, or 27 percent, under the alternative system, while cash expenses were \$327, or 11 percent lower, under the alternative system.

Throughout the entire period 1929-42, the number of breeding cows averaged 77 head under the former and 107 head under the alternative system. Average sales of 46 yearlings under the former and 64 under the alternative system were made throughout this period. Net cash farm income would have been approximately five percent higher under the alternative system.

Under the constant high price level there would have been the same relationship between income under each system as existed under the actual price level. Although cash expenses were greater, net cash income would have been considerably greater under the higher price level.

In developing these case studies, extremes have been used. It is probable, however, that on lands materially better suited for wheat in this area, the most stable organization in the long run would be a combination of wheat and livestock, in proportions dependent upon the acreage of good crop land available and on the resources at hand for the development of a livestock enterprise. In future years, even though it may not be advisable for a farmer to retain all of his wheat land in this crop, a portion of his better land kept in wheat may be a good risk year-in and year-out. Some in this area may find it desirable to include crested wheat grass in their crop rotations. It is difficult here to develop rotations capable of maintaining soil fertility and soil structure and at the same time to prevent wind and water erosion. Many now feel that crested wheat grass may provide the basis for a desirable crop rotation.

### *Conclusions*

Because of variable climatic conditions, agricultural production and income differ greatly from one year to the next and sometimes from one period of several years to another in the Great Plains. This study examines the possibilities of reducing variation in farm production and income, under weather conditions such as those experienced in 1929-42, and over a longer period, by shifting wheat land to crested wheat grass for livestock. The following conclusions from an intensive case study are considered applicable to

many other operating units in the Great Plains, particularly southwestern North Dakota:

(1) During periods of average or below-rainfall, net cash income of farmers would have averaged higher if less land had been devoted to wheat, and more used for crested wheat grass for livestock. Due to high yields of wheat with above-average rainfall in the forties, net cash income would have been greater had little or no crested wheat grass been grown. However, over the entire 1929-42 period net cash income would have averaged higher with more of this crop grown.

(2) A system of farming which included more crested wheat grass for livestock would help to stabilize farm income and production, both from one year to the next and from one period of several years to another. In times such as 1934, 1935, and 1936, when wheat was a total failure, crested wheat grass would yield some feed and provide farmers with income from the sale of livestock from current production, in addition to returns from liquidation in cattle numbers.

(3) Following a drouth, several years may be required to rebuild depleted livestock herds, during which time cattle numbers and sales may be below the mean, even though range production is average or above. This is one of the difficulties inherent in livestock production in the region.

(4) The extent to which crested wheat grass is an economical substitute for wheat can be decided only by additional analyses of other farming situations. Factors that would need to be considered include the acreage of low-yielding wheat land, the resources available for, and the inclination of the operator toward, development of a livestock enterprise. Lack of water may be an important limitation in some areas.

# INSTITUTIONAL METHODS OF MEETING WEATHER UNCERTAINTY IN THE GREAT PLAINS

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## *General Considerations*

A DISTINGUISHING characteristic of the Great Plains is the paramount importance of weather for successful farming. One of the principal economic problems of the area concerns the adaptation of the farm firm and of the governmental and other institutional policies affecting it, to variable and uncertain weather. This paper is concerned with those types of institutional action that may serve to alleviate the more serious aspects of weather risk.

Over the Great Plains region as a whole, runs of below-average and above-average crop yields of varying length have occurred intermittently. An example of two such sequences—nine years of yields below the average (1932–40), followed by eight years of those above average (1941–48)—is furnished by the series of average wheat yields for the 10 Great Plains States, shown in Table I. There are periods, moreover, when there have been fluctuations below and above average at yearly intervals—note the period from 1919 to 1926. The history of farming in the Plains is too short and our knowledge of weather phenomena too incomplete to enable one to formulate a probability distribution of expected runs of “good” and “poor” crop years.<sup>1</sup> The risk of adverse yield sequences at least as long as those that have occurred in recent decades must be anticipated, although it is not possible to estimate their distribution, or to attach probability values.<sup>2</sup> In terms of Professor Knight’s definition of risk and uncertainty, weather is an “uncertainty.”<sup>3</sup>

A second characteristic of weather variability in the Great Plains is the fact that counties in the area differ widely in the extent

<sup>1</sup> Part of the difficulty, also, lies in the limitations of statistical analysis when applied to time series. Note, in this connection, M. G. Kendall, “On the Analysis of Oscillatory Time-Series,” *Journal of the Royal Statistical Society*, 108 (1945) 98–129, and *The Advanced Theory of Statistics*, Volume II (London: Griffin, 1948).

<sup>2</sup> Correlogram analysis of State average wheat yields in Kansas over a 74-year period suggests a mean period of 3.2 years between peaks, and similar analysis for North Dakota a period of 3.3 years. These are merely the central values for distributions of sequences of varying lengths.

<sup>3</sup> F. H. Knight, *Risk, Uncertainty and Profit* (London, 1933).

to which crop yields may be expected to vary. Four levels of variability, in terms of the coefficient of variation of county wheat yields over the period 1926-48, are shown for the Great Plains in figure 1.

TABLE I. AVERAGE YIELD OF WHEAT PER SEEDED ACRE FOR 10 STATES IN THE GREAT PLAINS, 1919-48<sup>a</sup>

Year	Production	Seeded acreage	Yield per seeded acre	Percent of average yield, 1919-48
	<i>1,000,000 bushels</i>	<i>1,000,000 acres</i>	<i>Bushels</i>	<i>Percent</i>
1919	438.5	42.9	10.2	91
1920	467.9	39.8	11.8	105
1921	455.2	42.3	10.7	96
1922	474.5	41.9	11.3	101
1923	340.9	39.9	8.5	76
1924	531.7	34.9	15.3	137
1925	350.1	39.4	8.9	79
1926	472.6	40.6	11.6	104
1927	532.9	44.8	11.9	106
1928	631.9	47.4	13.3	119
1929	510.5	47.3	10.8	96
1930	550.5	47.7	11.5	103
1931	552.9	47.2	11.7	104
1932	454.2	47.3	9.6	86
1933	254.7	47.6	5.3	47
1934	222.7	43.2	5.1	46
1935	272.5	47.3	5.8	52
1936	263.1	50.6	5.2	46
1937	425.3	53.6	7.9	71
1938	495.5	54.4	9.1	81
1939	397.0	43.0	9.2	82
1940	437.5	42.2	10.3	92
1941	567.3	43.0	13.2	118
1942	680.2	36.6	18.6	166
1943	571.5	39.0	14.7	131
1944	684.8	46.3	14.8	132
1945	719.2	49.0	14.7	131
1946	756.9	53.1	14.2	127
1947	944.6	57.6	16.4	146
1948	810.5	55.3	14.5	129
Average	508.9	45.5	11.2	100

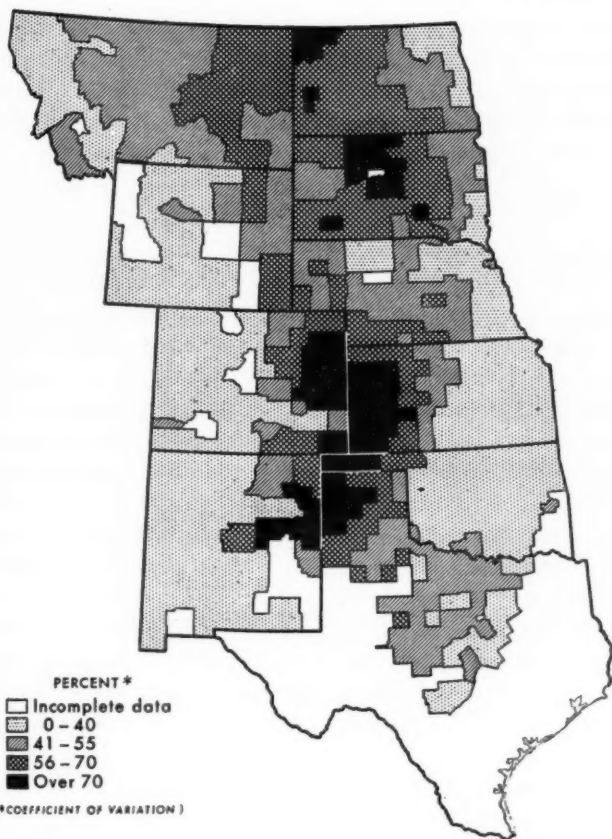
<sup>a</sup> The following States are included: Colorado, Kansas, Nebraska, New Mexico, North Dakota, Montana, Oklahoma, South Dakota, Texas, and Wyoming.

In those counties in which wheat is the principal crop, the level of variation is generally in excess of 40 percent of the mean yield. For a normal distribution, this could be interpreted as meaning that yield deviations 40 percent above or below the average should be



expected approximately a third of the time.<sup>4</sup> In the western part of the wheat area, the level of variation is more than 55 percent

**VARIABILITY OF WHEAT YIELDS PER SEEDED ACRE  
IN THE GREAT PLAINS, 1926-48**



U.S. DEPARTMENT OF AGRICULTURE

NEO 47522-X BUREAU OF AGRICULTURAL ECONOMICS

**FIG. 1.**

of the mean yield, and in a few counties it exceeds 70 percent of the average.

<sup>4</sup> As the distribution of yields over time is bounded at the lower end by zero, it is not strictly normal. There are indications, however, that the departure from normality is not great.

These two aspects of weather variability—the occurrence of general yield fluctuations, in which series of high or low yields are experienced throughout the region, and the existence of many local high-risk areas in which poor crops occur with more than average frequency—provide the context for consideration of economic adjustments to weather risk. Differences in degree of variability throughout the region might be expected to lead to a differential adaptation in the structure of the farm firm and to adjustments in land values that reflect degree of risk.<sup>5</sup> The general uncertainty which pervades the region as a whole is of particular significance for programs of institutional action that are designed to cope with weather risks.

### *The Problem and Objectives of Institutional Action*

Because of the widespread financial distress experienced in the Great Plains during the 1930's, it has been generally assumed that some type of governmental action is desirable to afford protection against extreme yield losses. Although the financial difficulties of this period must be attributed in part to low farm prices, the unstabilizing effects of weather on the farm firm suggest the need for a program of institutional action in relation to weather risks. Two aspects of this weather-induced instability deserve consideration:

(1) In the past, the unstable and widely fluctuating income of the farm firm has resulted in extended periods of "inadequate" income for family living. In many cases, this can be attributed to the failure of farm families to stabilize their income over time, based, in turn, on over-optimistic anticipations of future yields. In other cases, the nature of the yield sequence precluded the accumulation of reserves before extreme weather losses were experienced.

(2) The effect of yield instability on resource efficiency is not so readily apparent. It is probable, however, that during and immediately following periods of extremely adverse weather, farms in a highly variable rainfall area operate with less working capital

<sup>5</sup> T. W. Schultz has argued that one of the main purposes of a crop insurance program should be to incorporate in the value of the land the risk and burden of uncertainty inherent in the weather; "... the perfect solution would be a situation in which the value of each parcel of land measured and discounted accurately all the costs, over the long run, of all climatic hazards."—T. W. Schultz, *Agriculture in an Unstable Economy* (New York: McGraw-Hill, 1945), p. 217.

than is consistent with maximum resource efficiency. At these times, credit from private sources does not adequately supplement the rather limited capital available from previous farm income.<sup>6</sup> Many farms, also, are unable to survive a "run" of low yields. Farms which, in terms of average yield over a longer period, could earn satisfactory returns, are forced to liquidate assets because they lack the financial strength to carry them through periods of low yields.<sup>7</sup> Young farmers who have heavy debt payments are particularly vulnerable. Occurrence of serious yield losses is one of the principal barriers to the growth of the firm; it impedes both the acquisition of resources needed for efficient size and the attainment of security in control of resources.<sup>8</sup>

The highly irregular distribution of income over time, combined with uncertainty as to its sequence of occurrence, is the crux of the problem. Although yield uncertainty is experienced to some degree throughout agriculture generally, it is a dominant characteristic of farming in the Great Plains and because of this, the area deserves separate consideration.

What are the social objectives in terms of which policies intended to deal with yield uncertainty should be oriented? Two criteria are suggested here: (1) greater stability of annual income, with the assurance that the income of the farm family will be more evenly distributed from year to year and consequently fall less often below a level that may be regarded as a minimum "adequate" income; and (2) protection of the farm firm against financial stringency because of inability to meet the contingencies of uncertain and variable weather, but in a way that will not impair the efficiency of use of resources. These objectives may be stated quite generally as improving the stability of farm income over time.

Objectives such as these would presumably meet with rather

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<sup>6</sup> This shortage of capital is probably due in part to the reluctance of farmers to borrow in such circumstances, under the terms and conditions that credit is available.

<sup>7</sup> The resources in land and durable equipment are readily absorbed by other firms, and adjustments of this type which are part of the dynamic character of agriculture may lead to a better adaptation of the surviving farm firms to a highly variable environment. But much shuffling of resources occurs with no net gain in efficiency—in many cases with serious economic losses—and the social cost in terms of human resources is high.

<sup>8</sup> Security in the control of resources has been largely synonymous with growth in operator equity. The development of a tenure contract so that the parties interested in entrepreneurship would enjoy comparable security might offer important advantages in Great Plains farming.

general approval.<sup>9</sup> The choice of institutional techniques by which the objectives might be accomplished, however, involves a number of questions. For example, Should all the costs of a stability program be charged against the farms it is designed to benefit, or should the program involve income transfers from the rest of the economy to the Great Plains? Should emphasis be placed upon institutions for meeting and pooling individual risks, or should primary attention be given to a program that provides incentives for the adoption of self-stabilizing techniques? How positive a role should the Federal Government assume in endeavoring to introduce income stability—that is, should the adoption of stability measures be mandatory or permissive?

As these are questions that involve important socio-political considerations, definitive answers are not attempted here. Experience with similar questions, however, suggests the way in which they are likely to be resolved.

Although a reasonable case might be made for some type of compulsory stabilization plan, a program of this kind would be likely to meet strong resistance from farmers who prefer to assume their own risks.<sup>10</sup> A more likely alternative is the assumption by the Federal Government of responsibility for the provision of an institutional framework that would facilitate farmers in stabilizing their incomes over time. Whether all the costs of stability should be charged against those participating is probably not a serious issue. Many precedents may be found in other sectors of the economy for stabilization programs in which part of the cost is borne by the Government. Also, Federal expenditures to secure stability may serve to offset those that would be required for relief during periods of crop failure. As to the choice of techniques, it is suggested that, to a considerable degree, federally sponsored crop insurance, emergency credit, or methods that can be utilized by the farm firm without outside assistance, are substitutive. No single device is likely to prove satisfactory in all cases, and many farmers may wish to use a combination of methods.

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<sup>9</sup> For a careful analysis of stability objectives, involving both price and yield instability, see the paper by O. H. Brownlee and D. Gale Johnson, "Reducing Price Variability Confronting Primary Producers," this *Journal* XXXII (1950), 176-193.

<sup>10</sup> The Federal crop insurance program, for example, has failed to gain the participation of a majority of farmers.

*Alternative Stability Techniques*

The institutional measures that may be used to reduce the instability of income which results from weather risks are essentially of three types: (1) insurance against expected yield losses; (2) emergency loans after losses have occurred; and (3) tax benefits or penalties to induce the farm firm to accumulate reserves against possible yield losses. Although other institutional factors may affect the stability of income, the three enumerated would be among the principal components of any program directed toward minimizing the burden of weather uncertainty.<sup>11</sup>

*Insurance*

The insurance of crop yields provides a means whereby yield losses from unfavorable weather can be indemnified in return for a premium based on anticipated average losses. To the extent that the premium and indemnity accurately reflect the probability of yield losses for the farm firm, the insurance contract serves to convert some fraction (depending upon the level of coverage) of the income losses associated with less than average crop yields to an annual charge that may be budgeted as an operating cost. In principle, crop insurance affords the farm firm an opportunity to contract in advance of production for a net-income series with less dispersion than is normally expected without insurance. The practical effectiveness of insurance in stabilizing farm income over time depends upon the level of coverage offered, and upon the extent to which the premium-indemnity schedule correctly estimates the probability distribution of anticipated yields.

With the creation of the Federal Crop Insurance Corporation in 1938, insurance of crop yields against losses from weather and other natural causes became one of the major institutional techniques for meeting weather uncertainty. Although the insurance plan has been continually revised, and the present program is regarded as experimental, all-risk crop insurance has been available to wheat farmers throughout most of the period since 1939.<sup>12</sup> The current

<sup>11</sup> Tenure is one of the more important of the institutional factors not enumerated. The crop-share lease is one method by which tenant operators are able to shift part of the burden of weather uncertainty. The variable payment type of mortgage contract is another such device.

<sup>12</sup> The program was not in operation in 1944; in 1948 and 1949 the program was limited by law to 200 counties.

wheat-insurance program provides for an indemnity whenever the yield of wheat on the unit insured—the total acreage of wheat under the control of one operator or landlord—falls below the insured yield, or “coverage.” Insured yields and premium rates are developed for uniform “rate and coverage” areas which may vary in size from a small tract of land to an entire county.<sup>13</sup> The level of coverage is approximately 60 percent of the estimated long-time average yield. In the last two years multiple crop insurance, by which the joint return from two or more crops is insured with a single contract, has been offered experimentally in a few counties.

The operating experience of the Federal Crop Insurance Corporation over the last 10 years suggests two limitations in the program that has been developed: (1) The level of participation has been low. In 1940, the year when participation was highest, only 20.6 percent of the total seeded wheat acreage in the United States was insured. (2) Difficulties have arisen in developing an actuarial structure in which premium receipts would tend to balance indemnity payments over an extended period of operation. Because of these difficulties, the number of counties in which insurance may be offered has been rather strictly limited. If crop insurance is to serve as a major stability measure, it must be available to farmers over the entire Great Plains under terms that will encourage more widespread participation.

It has been suggested that these difficulties may be attributed, at least in part, to one of the principles of the insurance method used by the Federal Crop Insurance Corporation. Under each of the several insurance plans that have been used, indemnity payments have been determined separately in terms of the yield experience of each insurable unit. This method inherently has the effect, at each coverage and rate level, of attracting participation from farmers whose yield probabilities are poorer than average while discouraging participation from farmers who have better than average probabilities of attaining the insured yield level. It is obvious that such a tendency would weaken the actuarial structure of the insurance corporation, and tend to limit participation.

<sup>13</sup> Within each area the rates and coverages are uniform for all farms, except that differences are introduced for special practices, such as summer fallowing, for size of acreage insured, and previous favorable insurance experience. This rather broad classification of risks was developed after it became apparent that the yield data available for individual farms were inadequate for determining individual farm coverages and rates.



As an alternative method, it is suggested that indemnities be determined upon the basis of the average yields over relatively homogeneous areas. Such a revision would remove the basis for adverse selectivity, as the yield prospects on a particular farm would have no influence on whether an indemnity is received. Presumably, also, such a change might make insurance attractive to many farmers who now fail to participate.<sup>14</sup>

One may question whether a program of insurance with premium and indemnity payments determined on the basis of area yields would offer as great a degree of stability as a program of the present type. It is conceivable that in many cases the fluctuations in individual farm yields would run counter to the fluctuations in the area mean yield. The stabilizing effects of such a program would depend in large degree upon the extent to which areas could be delineated, throughout which the correlation between individual farm yields and the area mean yield is high. This is a matter that must be determined empirically.

In the past, the management of the Federal Crop Insurance Corporation has shown ingenuity in developing new insurance plans and a willingness to experiment to learn the effects of newly devised plans as a part of their operating program. The introduction of an area-yield type of insurance on an experimental basis in a few counties should be strongly recommended.

#### *Emergency credit*

In an industry in which the firms are of larger size and greater financial strength than exist in agriculture, one might expect private credit institutions to absorb much of the fluctuation in income which results from erratic production over time. Agriculture in the Great Plains is at a particular disadvantage in this respect. Entrepreneurial equity in the farm firm is relatively small in this area, in comparison to the amplitude of the fluctuations in farm income. This fact, in conjunction with the relatively high degree of uncertainty that is associated with agricultural prices, causes the private credit agencies to view short-term loans to farmers with considerable distrust, unless they are well secured by collateral.

<sup>14</sup> The suggestions that have been summarized here were made by Harold G. Halcrow in "Actuarial Structures for Crop Insurance," this *Journal*, XXXI (1949), 418-443. The reader is referred to this article for a more adequate discussion of these ideas, as well as a careful analysis of the effects of alternative types of insurance plans on resource allocation.

Many farm operators also are reluctant to borrow when farm income falls as a result of crop failure. As one poor crop year is frequently followed by another, repayment of the debt over a relatively short period is somewhat uncertain.

There is precedent, however, for the use of public credit to assist farmers after periods of crop failure, or other natural disasters. The emergency crop and feed loans over the period 1918-46 provide a notable example of such financing; the current "disaster loan" program conducted by the Farmers' Home Administration is another example.

Loans of this type by public agencies have been "stop-gap" measures to meet emergency situations. Generally, to qualify for a loan, the borrower was required to sign a statement to the effect that he could not obtain credit elsewhere, and that he did not have the resources to finance farm operation without Federal aid. Security was usually provided in the form of a crop lien. During the twenties and early thirties special congressional appropriations were made on each occasion after some specific emergency had arisen.<sup>15</sup> In recent years—until October 1946—funds were made available annually as part of the appropriation of the Farm Credit Administration.<sup>16</sup> From 1918 to October 31, 1946, emergency crop and feed loans amounting to \$503,929,135 were made, of which \$187,633,793 went to the 10 States in the Great Plains.

The authority to make "disaster loans," which is now vested in the Secretary of Agriculture, is rather broadly defined: the Secretary is authorized "to make loans to farmers and stockmen for any agricultural purpose in any area or region where he finds production disaster has caused a need for agricultural credit not readily available from commercial banks, cooperative lending agencies, or other responsible sources."<sup>17</sup> A revolving fund of 44 to 45 million dollars is available to the Secretary for this purpose, as a result of assets transferred in the liquidation of the Regional Agricultural Credit Corporation.

<sup>15</sup> Legislation during these earlier years frequently restricted the purposes for which such funds could be used—usually to seed, fertilizer, livestock feed, and tractor fuel. For a discussion of the crop and feed loans up to the end of 1935, see Norman J. Wall, *Federal Seed-Loan Financing and its Relation to Agricultural Rehabilitation and Land Use*, U. S. Department of Agriculture, Technical Bulletin 539 (October, 1936). For a discussion of the more recent years, see Donald C. Horton, *Inter-War Credit Aids Associated with Farm Ownership and Operation*, U. S. Department of Agriculture (May, 1945), pp. 47-52.

<sup>16</sup> On November 1, 1946, the administration of the crop and seed loans was transferred to the Farmers' Home Administration.

<sup>17</sup> Public Law 38, 81st Congress, which became effective April 16, 1949.

Thus, at present, it appears that the use of public credit as a stability measure is limited principally by administrative discretion and the amount of available funds. Although current lending operations under this program are small in scope, the institutional machinery is available so that the program could be rapidly expanded.

### *Tax measures*

Because of the influence which the personal income tax may have in stimulating the accumulation of financial reserves, it deserves consideration as one type of stabilizing technique.

A progressively graduated income tax places a premium on income stability over time. This is a consequence of the fact that the tax is paid on an annual basis, and that additional increments of income in any one year are taxed at increasingly higher surtax rates. Also in years when the taxpayer's income is less than the total exemption to which he is entitled, part of the benefit of the exemption is lost.<sup>18</sup>

In reporting farm income for tax purposes on a cash basis, stocks of goods produced for sale, which are held unsold, are not included in taxable income. This fact has a rather direct application to farming in the Great Plains. In years when wheat yields and farm income are above average, wheat may be placed in storage and held until a year of below-average income. Thus by accumulating grain, or other inventory items, a farmer is able to alter his taxable income from year to year. To the extent that the tax saving offsets the cost of storage, there is a net gain in carrying reserves of this type.

Crop insurance affords similar tax benefits. The premium paid may be used as a tax deduction, whereas the indemnity, although taxable, is received at a time when taxable income otherwise would be low.

Stocks of grain have definite limitations as reserves—they involve a storage cost and their value may be sharply depreciated by falling prices. Consideration might well be given, therefore, to a modification of the personal income tax law that would provide an incentive for accumulating financial reserves of a more liquid type. It would not be difficult to devise a method by which this might

<sup>18</sup> The only concession in the present income tax law to income irregularity is the "carry-forward," "carry-back" provision by which operating losses may be used to claim a refund on the tax paid up to two years earlier, or to reduce the tax paid in the two years following the loss.

be accomplished. For example, taxpayers could be allowed to devote a portion of their taxable income to purchasing "tax-saving-certificates" from the Bureau of Internal Revenue, the income thus used to be tax-free until the certificates were redeemed. A method of this kind would provide tax benefits in proportion to the extent that taxpayers were successful in using it to maintain income stability, as well as to stimulate the accumulation of reserves of a type that are desirable from the standpoint of financial security.<sup>19</sup>

*The Stability Effects of Alternative Policies, Illustrated  
by Two Models of Great Plains Wheat Farms*

In order to illustrate the probable effects of alternative institutional techniques on income stability, empirical models of wheat farms are presented for two selected areas in the Great Plains. The models were developed for a 660-acre "wheat-roughage-livestock" farm, such as might be found in the spring wheat area of northwestern North Dakota, and for a 605-acre winter wheat farm in western Kansas. In terms of such characteristics as size, production organization, farm practices, and cost rates, each of these farms corresponds to a rather broad modal group in a classification of farms with similar product characteristics in these respective areas in 1948.<sup>20</sup>

In constructing the models, estimated costs and returns were projected over time with crop yields varying from year to year in accordance with historical yield series. For purposes of analysis, it is assumed that prices paid and received are constant and that the farm organization—with respect to both crop acreages and livestock numbers—remains unchanged from year to year.<sup>21</sup>

<sup>19</sup> A proposal for an income tax provision of this nature was developed in a previous article. See: E. Lloyd Barber, "Modifying the Federal Income Tax to Promote Greater Stability of Farm Income," this *Journal*, XXX (1948), 331-339.

<sup>20</sup> Data were adapted from estimates prepared by the Bureau of Agricultural Economics for "typical, commercial, family-operated" wheat-roughage-livestock farms and winter wheat farms. The writers are indebted to Wylie D. Goodsell and James Vermeer for assistance in deriving the data.

<sup>21</sup> The crop acreages assumed are as follows:

	<i>North Dakota</i>	<i>Kansas</i>
	<i>Acres</i>	<i>Acres</i>
Wheat on summer-fallow	31	65
Other wheat	115	166
Flax	20	—
Barley	40	12
Oats	55	—
Grain sorghums	—	33
Sweet sorghums	—	10

Prices assumed in determining expenses and returns are based on a level of prices paid by farmers for items of production, interest, and taxes that is 175 percent of 1910-14, and a level of prices received that is 150 percent of 1910-14. Estimates of individual prices received are consistent with these general levels under the assumption that price supports and acreage controls are absent.<sup>22</sup>

Annual crop yields serve to give the models a time dimension and are the only dynamic factor in the analysis. In order to show the effect of weather variation without the influence of changing farm practices, yield series reported by the State Experiment Stations at Dickinson, N. Dak. and Colby, Kans. for the period 1915-48 were selected.<sup>23</sup> Using these yield data, the value of crops, livestock, and livestock products for sale and home consumption was estimated annually. By subtracting total expenses of farm operation, including depreciation—but excluding interest on investment or the imputed cost of family labor—estimates were made of the net income available to the farm operator for each of the 34 years of the period.

The income series thus developed, presented in the form of annual net operator income after tax, are shown in Table II. Three tenure situations are distinguished: (1) the operator owns the farm in full and is free of debt; (2) the operator is a tenant with a one-third crop-share lease; and (3) the operator is an owner with a mortgage debt approximately 75 percent of the value of the real estate, payable in equal annual installments over the 34-year period with interest at  $4\frac{1}{2}$  percent.

As net operator income after tax is equivalent to income available for family living, these series mirror the effect of variations in crop yields on the financial position of the farm family. A minimum "adequate" family budget, under the prices assumed, is estimated as \$1,407 for the winter wheat farm, and \$1,403 for the wheat-roughage-livestock farm.<sup>24</sup> Under each of the three tenure assump-

<sup>22</sup> The price assumptions are those shown for "the average level for intermediate employment conditions" in the report prepared in 1948 for the Committee on Agriculture of the House of Representatives, "A Study of Selected Trends and Factors Related to the Long-Range Prospect for American Agriculture." From the standpoint of the current level of farm prices, these assumptions may seem somewhat pessimistic.

<sup>23</sup> It was necessary to make minor adjustment in the Dickinson series so that the yield levels would be realistic. The annual gross income of the "wheat-roughage-livestock" model was reduced approximately \$1,000 by this adjustment.

<sup>24</sup> These estimates, which are obviously rather arbitrary, were made by adjusting the estimated living costs for a city worker's family of four that were developed by the U. S. Bureau of Labor Statistics and reported in Bulletin 927, *Workers' Budgets*

TABLE II. NET OPERATOR INCOME AFTER TAX AS DETERMINED FROM EMPIRICAL MODELS OF WHEAT FARMS IN WESTERN KANSAS AND NORTHWESTERN NORTH DAKOTA WITH CONSTANT PRICES, AND CROP YIELDS REPORTED BY THE EXPERIMENT STATIONS AT COLBY, KANS. AND DICKINSON, N. DAK., 1915-48

Year	Winter-wheat farm (western Kansas)			Wheat-roughage-livestock farm (northwestern North Dakota)		
	Debt-free owner operator	Tenant operator <sup>a</sup>	Encum- bered owner operator <sup>b</sup>	Debt-free owner operator	Tenant operator <sup>a</sup>	Encum- bered owner operator <sup>c</sup>
	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
1915	4,847	3,366	3,943	7,766	6,098	7,373
1916	4,784	3,142	3,878	4,806	3,827	4,403
1917	-62	262	-972	763	1,431	308
1918	1,656	1,321	632	550	-69	95
1919	3,720	3,144	2,806	-738	-739	-1,193
1920	5,289	3,732	4,377	3,051	2,096	2,596
1921	4,652	3,384	3,736	-91	-321	-546
1922	4,658	3,437	3,742	5,881	4,836	5,520
1923	3,334	3,237	2,414	3,069	2,379	2,662
1924	3,753	2,629	2,831	4,438	3,534	4,027
1925	3,210	2,353	2,280	1,228	562	773
1926	1,204	1,023	180	-482	-539	-891
1927	782	975	-242	3,768	3,084	3,355
1928	5,884	3,942	4,950	3,932	3,187	3,519
1929	2,591	2,025	1,567	1,943	1,314	1,488
1930	8,553	5,826	7,631	1,850	1,394	1,395
1931	3,892	3,168	2,952	-843	-811	-1,298
1932	4,323	3,241	3,379	3,794	2,773	3,369
1933	1,209	1,545	185	340	81	-115
1934	136	307	-834	-573	-675	-1,078
1935	-219	117	-1,243	1,775	1,139	1,320
1936	-263	73	-1,287	-1,308	-1,118	-1,763
1937	313	440	-711	131	-369	-324
1938	1,565	1,373	541	436	89	-19
1939	809	815	-215	4,441	3,543	4,020
1940	857	1,193	-167	1,639	1,052	1,184
1941	4,665	3,670	3,687	2,067	1,383	1,612
1942	4,635	3,302	3,651	7,422	5,080	6,989
1943	3,349	2,485	2,361	3,852	3,027	3,415
1944	5,119	3,739	4,127	4,900	3,700	4,459
1945	4,432	3,117	3,432	3,836	3,079	3,393
1946	2,222	1,733	1,198	1,337	706	882
1947	7,551	4,998	6,541	3,658	2,970	3,207
1948	2,043	1,972	1,019	4,964	3,801	4,513
Average	3,103	2,385	2,128	2,459	1,810	2,020

<sup>a</sup> Tenant with one-third crop-share lease.

<sup>b</sup> Annual debt charge of \$1,024.

<sup>c</sup> Annual debt charge of \$455.

in the United States: City Families and Single Persons, 1946 and 1947 (Washington, February, 1948).



tions presented in Table II, average income over the 34-year period is well above these minimum levels. But in approximately a third or more of the years, available income for family living falls below these minima. The deficiency is smallest if the operator is assumed to be a debt-free owner, and greatest if the operator is an encumbered owner with the rather heavy debt payments assumed here.

### *Crop insurance*

How effective is crop insurance in introducing greater stability of income in this situation? The stabilizing effects of two alternative crop insurance plans are illustrated in Table III for the encumbered owner-operator. The wheat insurance plan is the "commodity" type of insurance offered by the Federal Crop Insurance Corporation in its 1950 program. The multiple crop insurance plan is one in which the joint return from all grain crops (wheat, barley, and grain sorghums for the winter wheat farm; wheat, oats, barley, and flax for the wheat-roughage-livestock farm) is insured under a single contract. In each case, the premium is computed as the average of all indemnities received for a coverage based on 60 percent of average yield. This is an idealized situation, as in practice total insurance premiums might exceed or fall short of total indemnities.

The gain in income stability from crop insurance is indicated by a higher average net income after tax, and by fewer years of negative income. The number of years in which net income falls short of minimum estimated living costs, however, is as great under either insurance plan as without insurance, although the accumulated deficiency over the period is much smaller. Greater income stability could be attained by crop insurance under either or both of two conditions: (1) the insurance of a higher percentage of average yield; (2) the collection of insurance premiums only in years of above-average yield. Neither of these conditions is included in the present program of the Federal Crop Insurance Corporation.

### *Emergency credit*

Crop insurance as a method of income stability can be supplemented by the provision of credit in years of low income. The amount of credit needed to maintain net income after tax at the level of the estimated minimum family budget each year of the period is



indicated in Table IV. As the amount of credit required is inversely related to the extent to which reserves are accumulated during

TABLE III. NET INCOME AFTER TAX FOR AN ENCUMBERED OWNER-OPERATOR  
(1) WITHOUT CROP INSURANCE, (2) WITH WHEAT CROP INSURANCE, AND  
(3) WITH MULTIPLE CROP INSURANCE, BASED UPON THE  
EMPIRICAL MODELS PRESENTED IN TABLE II

Year	Winter-wheat farm (western Kansas)			Wheat-roughage-livestock farm (northwestern North Dakota)		
	Without insurance	With wheat crop insurance	With multiple crop insurance	Without insurance	With wheat crop insurance	With multiple crop insurance
	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
1915	3,943	3,666	3,574	7,373	7,220	7,025
1916	3,878	3,601	3,509	4,403	4,246	4,045
1917	-972	-69	502	308	403	587
1918	632	307	486	95	-90	66
1919	2,806	2,531	2,439	-1,193	-484	313
1920	4,377	4,100	4,008	2,596	2,411	2,174
1921	3,736	3,461	3,367	-546	-135	272
1922	3,742	3,465	3,371	5,520	5,303	5,100
1923	2,414	2,103	1,995	2,662	2,501	2,264
1924	2,831	2,554	2,462	4,027	3,870	3,669
1925	2,280	1,955	1,847	773	588	351
1926	180	-145	592	-891	-354	332
1927	-242	507	515	3,355	3,200	2,997
1928	4,950	4,675	4,583	3,519	3,362	3,159
1929	1,567	1,242	1,134	1,488	1,303	1,066
1930	7,631	7,364	7,274	1,395	1,210	973
1931	2,952	2,675	2,585	-1,298	-545	243
1932	3,379	3,102	3,010	3,389	3,142	2,891
1933	185	1,214	479	-115	246	405
1934	-834	-187	319	-1,078	-404	115
1935	-1,243	-214	357	1,320	1,135	898
1936	-1,287	-258	313	-1,763	-830	78
1937	-711	-99	390	-324	-509	11
1938	541	216	396	-19	67	277
1939	-215	148	419	4,020	3,889	3,652
1940	-167	862	448	1,184	999	762
1941	3,687	3,410	3,320	1,612	1,427	1,190
1942	3,651	3,376	3,284	6,989	6,834	6,641
1943	2,361	2,084	1,992	3,415	3,258	3,055
1944	4,127	3,850	3,758	4,459	4,300	4,099
1945	3,432	3,157	3,065	3,393	3,236	3,033
1946	1,198	873	765	882	697	460
1947	6,541	6,274	6,184	3,207	3,050	2,849
1948	1,019	1,222	586	4,513	4,354	4,155
Average	2,128	2,148	2,157	2,020	2,026	2,037

favorable years, some assumption on this point is necessary. It is postulated here, rather arbitrarily, that one-half of all surplus

income above the minimum living requirement is accumulated. The accrued surplus—or deficiency—is shown each year for two al-

TABLE IV. ACCUMULATED SAVINGS OR DEFICITS, UNDER THE ASSUMPTION THAT ONE-HALF NET INCOME AFTER TAX AND AFTER FAMILY LIVING REQUIREMENTS IS SAVED, ILLUSTRATED FOR THE ENCUMBERED OWNER-OPERATOR AND THE EMPIRICAL MODELS OF TABLE II<sup>a</sup>

Year	Winter-wheat farm (western Kansas)		Wheat-roughage-livestock farm (northwestern North Dakota)	
	Without insurance	With multiple crop insurance	Without insurance	With multiple crop insurance
	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
1915	1,268	1,084	2,985	2,811
1916	2,504	2,135	4,485	4,132
1917	125	1,230	3,390	3,316
1918	-650	309	2,082	1,979
1919	50	825	-514	889
1920	1,535	2,126	82	1,275
1921	2,699	3,106	-1,867	144
1922	3,867	4,088	191	1,992
1923	4,371	4,382	821	2,422
1924	5,083	4,910	2,133	3,555
1925	5,519	5,130	1,503	2,503
1926	4,292	4,315	-791	1,482
1927	2,643	3,423	185	2,279
1928	4,415	5,011	1,243	3,157
1929	4,495	4,738	1,285	2,820
1930	7,607	7,672	1,277	2,390
1931	8,379	8,261	-1,424	1,230
1932	9,365	9,063	-431	1,974
1933	8,143	8,135	-1,949	976
1934	5,902	7,047	-4,430	-312
1935	3,252	5,997	-4,513	-817
1936	558	4,903	-7,679	-2,142
1937	-1,560	3,886	-9,406	-3,534
1938	-2,426	2,875	-10,823	-4,660
1939	-4,048	1,887	-9,520	-3,536
1940	-5,622	928	-9,739	-4,177
1941	-4,482	1,884	-9,635	-4,390
1942	-3,360	2,822	-6,842	-1,771
1943	-2,883	3,114	-5,836	-945
1944	-1,523	4,290	-4,308	403
1945	-511	5,119	-3,313	1,218
1946	-720	4,477	-3,834	275
1947	1,847	6,865	-2,932	998
1948	1,459	6,044	-1,377	2,374

<sup>a</sup> Assuming a family living requirement of \$1,407 for the winter-wheat farm and \$1,403 for the wheat-roughage-livestock farm.

ternative situations, one in which the operator does not insure crop yields, the other in which multiple crop insurance is carried.

By saving half of all income above the family living requirement,

and insuring under a multiple crop insurance plan, the encumbered owner-operator on the "winter-wheat farm" would be assured of sufficient funds to meet the minimum budget each year of the period without borrowing. On the "wheat-roughage-livestock" farm, with crop insurance, a credit advance of \$4,660 would be needed to cover the accumulated deficiency at one point in the period. Without crop insurance, large deficits accrue—\$5,622 for the "winter-wheat farm" and \$10,828 for the "wheat-roughage-livestock farm."

In many cases crop insurance supplemented by the systematic accumulation of financial reserves would prove to be an effective means of maintaining a minimum level of family income. Debt-free and less heavily encumbered owner-operators could accumulate reserves more readily than the rather deeply indebted operator for which the illustrative materials have been developed. In other cases, however, the point of time in the yield sequence at which the operator began to farm would preclude the accumulation of adequate reserves before serious contingencies developed. Emergency financing, through a type of public credit that would allow repayment over a period of several years, would be essential for the maintenance of a minimum income level in such cases.

#### *Tax-induced reserves*

As pointed out earlier in this paper, the Federal income tax may serve to stimulate the accumulation of durable farm commodities. One of the types of reserves most commonly held by Great Plains farmers has been grain stored on the farm. The stability effects of this type of reserve are illustrated in Table V where it is assumed that, within a maximum storage capacity of 5,000 bushels, wheat is placed in storage in years of above-average income and withdrawn from storage and sold when income is below average. Additions to storage and withdrawals are made so that net income each year is adjusted as closely as possible to the average income for the 34-year period. Storage operations of this type would tend to maximize income stability within the limit of physical storage capacity that has been assumed.

Such storage operations are effective in smoothing over short periods of low income, but they fail to maintain income over a long period of low yields such as that from 1933 to 1940. Although the greater stability of year-to-year income after storage results

TABLE V. NET INCOME AFTER TAX FOR AN ENCUMBERED OWNER OPERATOR UNDER THE ASSUMPTION OF ALTERNATIVE STABILITY PLANS—(1) GRAIN STORAGE ON THE FARM, (2) VARIABLE TAX-PAYMENT PLAN BASED ON THE EMPIRICAL MODELS DEVELOPED IN TABLE II.

Year	Winter-wheat farm (western Kansas)		Wheat-roughage-livestock farm (northwestern North Dakota)	
	Assuming grain storage on the farm <sup>a</sup>	Assuming a variable tax payment plan <sup>b</sup>	Assuming grain storage on the farm <sup>a</sup>	Assuming a variable tax payment plan <sup>b</sup>
	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>	<i>Dollars</i>
1915	2,151	3,265	3,306	5,225
1916	2,095	3,225	3,387	3,574
1917	2,200	465	1,965	1,403
1918	933	632	2,028	1,403
1919	2,194	2,621	374	-61
1920	2,118	3,479	2,065	2,588
1921	2,066	3,120	-181	-538
1922	2,867	3,118	2,300	4,351
1923	2,182	2,383	1,956	2,598
1924	2,621	2,605	2,519	3,347
1925	2,042	2,280	1,951	1,403
1926	2,107	1,407	2,047	590
1927	2,185	1,407	2,007	2,967
1928	2,088	3,742	1,960	3,053
1929	2,110	1,567	1,980	1,488
1930	5,575	5,224	2,003	1,403
1931	2,744	2,614	1,089	-304
1932	3,171	2,840	2,041	3,263
1933	2,107	1,407	1,043	-115
1934	2,195	1,407	-1,154	-952
1935	-1,088	740	1,244	1,320
1936	-1,363	-1,287	-1,839	-1,763
1937	-787	-711	-400	-324
1938	465	541	-95	-19
1939	-291	-215	2,013	3,306
1940	-243	-167	2,043	1,403
1941	2,127	2,905	2,060	1,612
1942	2,080	2,871	2,620	4,908
1943	2,069	2,145	3,205	2,921
1944	2,242	3,101	4,249	3,486
1945	3,224	2,704	3,183	2,895
1946	2,031	1,407	1,948	1,403
1947	5,437	4,393	1,910	2,777
1948	2,023	1,407	4,260	3,487
Average <sup>c</sup>	2,056	2,199	1,960	2,079

<sup>a</sup> It is assumed that, within a limit of 5,000 bushels storage capacity, wheat is placed in storage whenever annual net operator income exceeds the average for the period, and is withdrawn from storage and sold in years of less than average income.

<sup>b</sup> A modification of the present income-tax law is assumed which allows individual taxpayers to use up to one-half of "taxable income" for the purchase of "tax-saving certificates." These certificates are held tax-free until redeemed.

<sup>c</sup> The value of the reserve at the end of the period is included in the average.

in tax savings, these are more than offset by the annual storage costs, so that there is a net reduction in average income after tax—\$72 for the “winter-wheat farm,” \$60 for the “wheat-roughage-livestock farm.”

Data are also presented in Table V to show the effects of a variable tax-payment plan on income stability. A modification of the present Federal income tax law is postulated under which it would be possible to save up to one-half of “taxable income” (after deductions and exemptions) tax-free by purchasing a type of tax-saving certificate that would be issued for this purpose by the United States Treasury. Redemption of the certificates would be at the option of the purchaser, and the proceeds would be taxed as income in the year of redemption. By purchasing such certificates in years of above-average income and redeeming them when income was below average, farm taxpayers could make tax savings as well as improving the distribution of their incomes over time.

By itself, a plan of this type falls far short of the stability goal of maintaining net income each year at the level of the estimated minimum family budget. But as the benefits offered in terms of a smaller tax liability should provide a strong inducement for the accumulation of financial reserves—for example, the annual tax liability is reduced by 71 dollars for the “winter-wheat farm” and 59 dollars for the “wheat-roughage-livestock farm” in the illustration in Table V—the use of such a device as a supplementary stability measure deserves serious consideration.

The general effectiveness of institutional methods of the type illustrated here in reducing income instability in the Great Plains will depend very largely upon the degree of participation. In the past crop insurance has not won widespread support, nor have farmers been conspicuously successful in accumulating reserves during years of high income. This difficulty should be overcome in part through improvements along the lines suggested earlier in the paper. Progress could be made also in providing greater flexibility in the methods of financing local government and in contracts of debt repayment so that the annual charges against farm income would be related to a variable income pattern.

## SPACE AS A SOCIAL COST

An approach toward community design in the sparsely populated areas of the Great Plains\*

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### *Introduction*

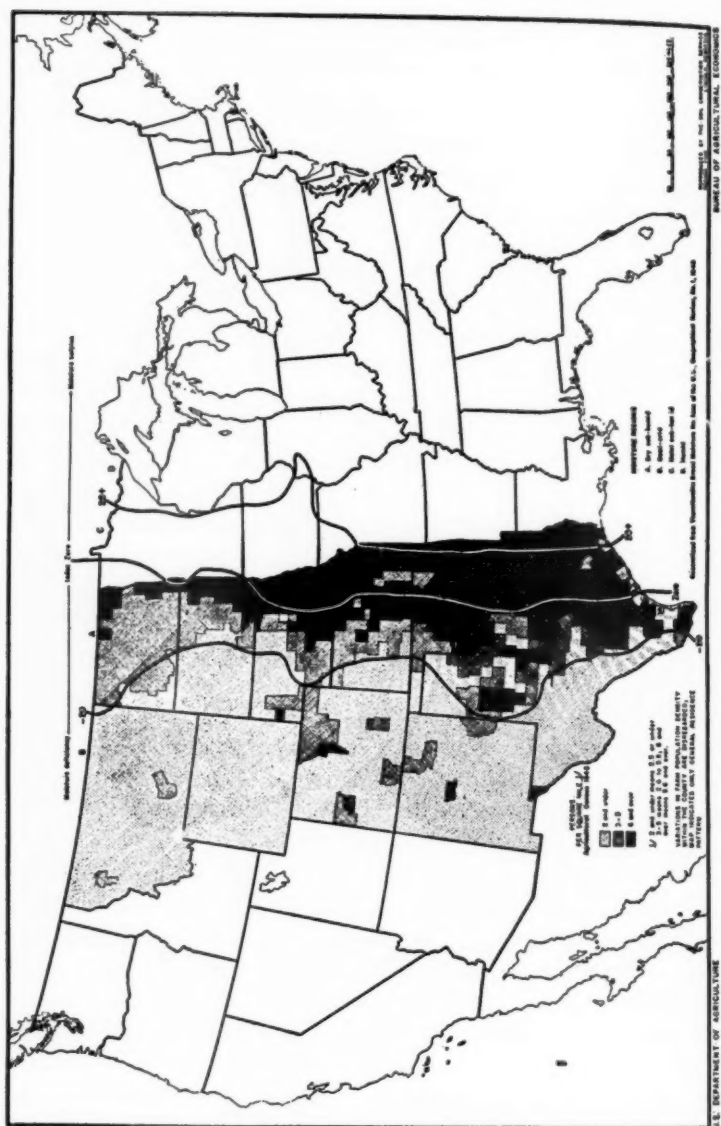
THE farther people live from the city, the costlier and less available modern services are likely to be. Other things being equal, community facilities and rural services vary directly with the density of the population. This is illustrated by a recent Bureau of Agricultural Economics study<sup>1</sup> which classified the 3,071 counties of the United States by the proportion of farm people in the county. In the most rural counties (farm population 80 percent of total) 28 percent of births were in hospitals in 1946; in the most urban counties (farm population 20 percent of total) it was 93 percent. The most rural counties had 45 hospital beds per 100,000 population and the most urban, 432 beds; the former had 31 physicians per 100,000; the latter 432. Ten percent of adults in the former had completed high school; in the latter, 27 percent. Of the farm dwellings in the most rural counties, 19 percent had electricity as against 68 percent in the most urban (1945); seven percent of the farm dwellings in the most rural counties had running water, and 47 percent in the most urban counties. Four additional items included in the study show similar differences.

Other classes of counties (farm population 60-80 percent, 40-60 percent and 20-40 percent) also show a surprisingly consistent relationship between individual levels of living items and the proportion of the population on farms. Farm families evidently benefit by the more highly organized services of cities and larger towns when they are near-by. Larger population aggregates in a given physical area provide better support for specialized services.

The line which divides the United States into two great moisture regions traverses Texas, Oklahoma, Kansas and Nebraska, and

\* Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas and Wyoming.

<sup>1</sup> *Farm Living—Agricultural Situation*, Oct. 1949, Bureau of Agricultural Economics—T. W. Longmore, Grace L. Flagg.





separates the Dakotas from Minnesota.<sup>2</sup> Moisture is generally deficient west of this line (near the ninety-sixth meridian). Climate in the Great Plains west of the line is dry sub-humid to semi-arid. Here farmers engage in extensive wheat and livestock farming and live relatively far apart and far from cities. Community life tends to pivot on small towns and villages. As the plain sweeps westward and upward toward the snow-covered Rockies, the population becomes more sparse. Moisture zones are reflected in the farm population patterns (Fig. 1). This wide range of population density over extensive areas permits observation of the influence of distance on community life. Of the 826 counties in the 10 states studied 373 have no towns with population over 2,500. In much of this area farmers and ranchers are presently at a disadvantage in acquiring many of the modern services and in organizing community life.

Significant adaptations are being made in the use of land resources in the Plains; indeed, they have been in progress since the area was occupied. New concepts of family-farm units have greatly reduced farm population numbers, especially during the last quarter century. More economic units and a better balance between people and land sets the stage for realistic community modernization. Distinctive adjustments in community design must somehow be made by the people of the Plains if efficient community life is to be attained. Where population is sparse, and towns therefore small, patterns of organization adapted to rural communities of more humid areas or suburban type counties, do not fit. In large areas of the Plains, adequate schools, roads, and other communications, farm electrification, churches, marketing, health facilities, and other services are now provided only at great cost. They need to be adapted to the social environment, even as farming is being adapted to the climatic conditions. This paper is intended to suggest one approach to an analysis of conditioning factors in community life. Data used are from the 1940 census, but for purposes of illustration they appear satisfactory.

### *The Role of Space in Community Life*

The radius of the trade-area community in the Great Plains

<sup>2</sup> Where potential evaporation and transpiration equal precipitation. Thornthwaite: "An Approach to a Rational Classification of Climate," *Geographic Review*, Vol. 38, No. 1, 1948.

reflects population density variations between broad moisture zones. The variation is generally from smaller community areas in both the moist and dry subhumid zones, to larger community areas as annual rainfall diminishes westward over the broad semi-arid reaches of the high Plains. The distance between families determines in large part the effectiveness of communication and the cost of essential services. Four classes of towns, with their service areas, were compared to help visualize the relative space occupied by specified populations in different population density zones (Figs. 2 and 3). It was assumed that, other things being equal, a given population tends to support a given pattern of community service.

The population aggregate used in connection with a town in the 2,500-3,000 class is equal to four times the number of inhabitants reported for the town itself, in the 1940 census. Populations of towns in the 2,000-2,500 class were likewise multiplied by four. In other words, with respect to these two classes of communities it is assumed that the outside population dependent upon the services of a given town is in a proportion of three to one. In the case of towns of 1,500-2,000 class, and of 1,000-1,500 class, populations were multiplied by three, on the assumption that the proportion is two to one. This is a judgment determination of differences in the average range of services in towns of 2,000-3,000 population, and in those of 1,000-2,000 respectively. Towns are classified in four rather than two categories to hold population aggregates relatively constant. The number of rural inhabitants per square mile in the county where the town is located was used to arrive at the area occupied by a given population aggregate. Population is held constant, while the area varies.

Figure 2 shows 74 hatched circles ranging in radius from 44 miles to seven miles, each containing similar numbers of persons (10,000 to 12,000), and including all towns of 2,500 to 3,000 population in the 10-state area. The 127 unhatched circles on this map represent populations of 8,000 to 10,000, the radii again ranging from 44 to seven miles. Circles are drawn to scale with the larger circles being of the order of 6,100 square miles and 88 miles in diameter. Actual range is greater than that shown by the relative area of the circles (from 7,600 to less than 100 square miles). Only nine of the ten states show towns of the 2,500-3,000 class; but the hatched circles permit broad comparison between the sub-humid

zones and the more arid zones where population is most sparse. All 10 states have towns of the class of 2,000–2,500; and unhatched

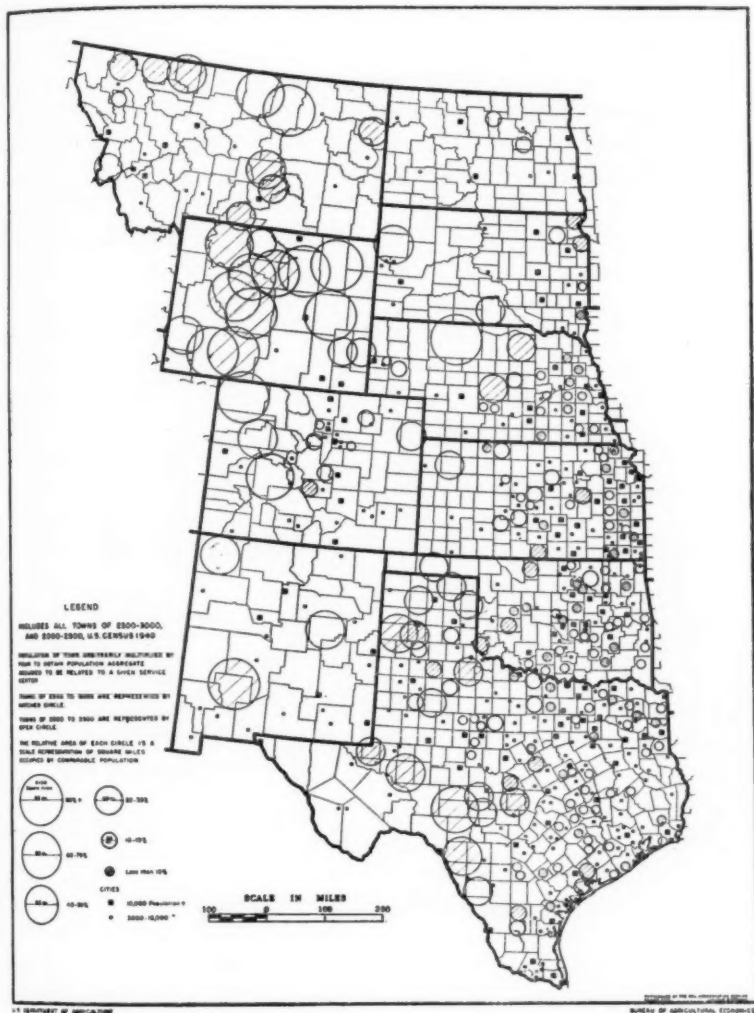
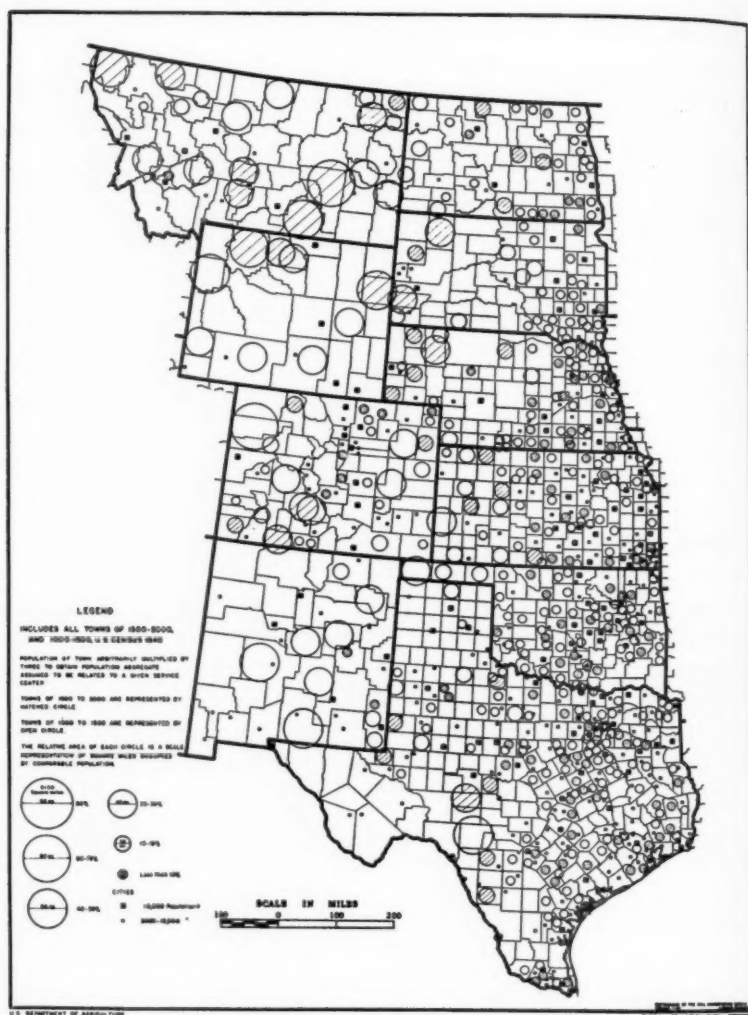


FIG. 2.—AREA OCCUPIED BY COMPARABLE POPULATION IN DIFFERENT POPULATION DENSITY ZONES IN THE GREAT PLAINS TOWNS 2,500–3,000, 2,000–2,500

circles likewise illustrate the role of distance in community life, in the respective zones.

Figure 3 shows 145 hatched circles ranging in radius from 40 miles to seven miles, each containing from 4,500 to 6,000 persons,



4,500, the radius ranging from 40 miles to 7 miles. Circles are drawn to scale, with the larger circle representing an area of about 5,000 square miles, and with a diameter of 80 miles. All states show towns of those classes.

It may be noted that the sub-humid and relatively dense population zone has large numbers of all the above classes of towns (population 1,000 to 3,000), and that the trade areas are relatively compact. In the semi-arid, sparse population zone, these towns are fewer and comparable population aggregates are distributed over surprisingly large areas. Although the area of the circles in Figures 2 and 3 do not follow a perfectly regular pattern, they do present a remarkable picture of the way space functions in community life in different parts of the Great Plains. Table I indicates the relative number of community areas of different size, and shows distribution by states. Communities spread over the larger areas are extremely tenuous, and their problems of organization obviously differ from those of the more compact communities with a radius of seven miles or less.

The implication of the wide difference in the physical area of communities is twofold. On the one hand is the relative cost and effectiveness of community services; on the other is the relative efficiency of local communication. Public and private costs of services are greatly increased by distance. Roads cost more per capita for a community with some of its members 45 miles from town than one in which the distance is seven miles, and it costs more to "go to town" and to participate in community life. This is also true of schools—with transportation and boarding costs high, and many school units too small for efficiency. Health service means heavy costs for the doctor's travel on emergency home calls, and remote hospital facilities. Farm electrification is expensive, and good telephone service comes high. Participation in community life is hampered by distance and isolation, especially where all-weather roads cannot be installed and maintained. In such areas, organized activities are not well sustained. In some cases they are not even undertaken, because of the extraordinary effort required. Assuming equal communication, road mileage and travel distance in a community 90 miles in diameter is more than six times that of one 14 miles in diameter. Thus either people in such communities will need larger family incomes, or community life and local services will be under par. Perhaps services and facilities will

TABLE I. RADIUS OF AREA OCCUPIED BY POPULATIONS ASSOCIATED WITH FOUR CLASSES OF TOWNS<sup>a</sup>  
BY STATES (U. S. CENSUS, 1940)

Radius, and Population	Total	Colorado	Montana	New Mexico	Wyoming	Texas	North Dakota	South Dakota	Nebraska	Kansas	Okl- homa
44 mi. radius	11	1	1	1	7				1		
10,000-12,000	4			1	3						
8,000-10,000	7	1	1		4				1		
4,500-6,000	0										
3,000-4,500	0										
40 mi. radius	8	2	2		3	1					
10,000-12,000	3				2	1					
8,000-10,000	3	1	1		1						
4,500-6,000	1		1								
3,000-4,500	1	1									
33 mi. radius	20	1	5	5	4	4		1			
10,000-12,000	6		3			3					
8,000-10,000	5	1		2	1		1				
4,500-6,000	5		2	1	2						
3,000-4,500	4			2	1	1					
24 mi. radius	56	7	15	4	8	12		3	3	2	2
10,000-12,000	10		4			4			2		
8,000-10,000	15	1	1		3	7		1		1	
4,500-6,000	11	2	4		1	1		2	1		
3,000-4,500	20	4	6	4	4					1	1
19 mi. radius	95	11	6	4	1	25	10	9	10	16	3
10,000-12,000	13	1				5		2	1	2	2
8,000-10,000	23	3	1			9		2	1	2	5
4,500-6,000	24	3	1	1		6	4	1	4	4	
3,000-4,500	35	4	4	3	1	5	4	5	3	5	1
7 mi. radius	459	18	2			168	25	43	65	67	71
10,000-12,000	38					14		1	5	7	11
8,000-10,000	74	2				32		2	9	10	19
4,500-6,000	104	6	1			39	6	2	14	16	20
3,000-4,500	243	10	1			83	19	38	37	34	21

<sup>a</sup> Town populations of 2,500-3,000 and 2,000-2,500, respectively, are multiplied by four; those of 1,500-2,000 and 1,000-1,500, by three.



always necessarily be somewhat more expensive, and community participation more inconvenient, in the far-flung communities. But much can be done to adapt community life to the social environment. Indeed, firm occupancy of the Great Plains calls for basic adjustments in institutional patterns and social organization, which will provide "parity of services."

This adjustment has two broad aspects—adaptation of services to sparse areas, and reorganization of the residence pattern. It is becoming increasingly evident that efficiency of design is imperative if communities in the semi-arid and dry sub-humid Plains are to enjoy the full benefit of modern technology. Great distances and small towns, both characteristic of this region of extensive farming, constitute an overhead cost not met with elsewhere. This *overhead* can be minimized by adapting services to the environment. The community itself may need to be reorganized, from the standpoint of the location of family residences. Elmer E. Starch, Executive Secretary of the Great Plains Council, says that we are entering a period in which consideration of adjustment of communities and reorganization of public services will receive a great deal of attention. As standards of rural living rise, the farm operator must make a choice as to whether to get the last additional pound of gain on his livestock or to provide educational facilities for his children, perhaps by operating his farm from town. In other ways also, social considerations are tipping the scales toward new patterns of residence in extensive farming areas. It may well be that the "crux of community progress in the Plains lies in devising new instruments which will enable farmers and ranchers to have a satisfactory management relationship to their resource and yet take advantage of modern community facilities."

### *The Small Town as the Pivot of the Community*

Nearly half (45 percent) of the counties in the 10 state area are without towns of 2,500 population (Fig. 4). These counties often occur in blocks, some of which extend over 25,000 square miles. Thus many families are a hundred miles from a town of even the 2,500 class, and must depend upon villages or small-town service centers. This means that a wider complement of services is needed in the small towns of these areas than is required in similar towns farther east. The thesis here is that a new concept of community organization could raise the level of services in such areas and could

\* Town populations of 2,500-3,000 and 3,000-2,500, respectively, are multiplied by four; those of 1,000-2,000 and 1,000-1,000, by three; those of 500-1,000, by two; and those of 100-500, by one. Areas in excess of 25,000 square miles are multiplied by five.

minimize the public and private costs of many of the elements of family living.

Large cities do not exist in the Plains. Only 10 have populations of 100,000 or more, in an area making up 37 percent of continental United States. High specialized services are thus needed in the 100 small cities with populations between 10,000 and 100,000, and indeed, in towns of 3,000 to 10,000 people (Table II). Extensive areas in fact depend upon towns with populations of 1,000 to 3,000 for shopping and marketing, and for most specialized services. There are 649 such towns in the 10 states, many of them county seats. Most towns of this group depend mainly upon agriculture. Three hundred have only 1,000 to 1,500 people; two hundred have populations between 2,000 and 3,000. Generally, they are centers of community life for farmers as well as townspeople. The larger towns seem the most likely centers of adapted specialized services in sparse population areas; contingent upon circumstances, towns of 1,000 to 2,000 population may also supply some specialized services to the areas dependent upon them.

TABLE II. NUMBER OF CITIES, TOWNS AND VILLAGES BY POPULATION GROUPS, GREAT PLAINS

States	Size Groups									Less than 50	Total Populated Places
	Over 10,000	3,000-10,000	2,500-2,999	2,000-2,499	1,500-1,999	1,000-1,499	500-999	250-499	50-249		
Colorado	8	21	1	9	11	19	74	74	192	573	992
Kansas	20	35	9	16	19	40	133	133	485	354	1,244
Montana	6	9	7	4	9	11	49	49	273	447	864
Nebraska	9	18	8	12	19	37	104	104	267	244	822
New Mexico	5	20	1	2	2	9	66	78	269	313	765
North Dakota	4	7	0	2	10	23	63	63	295	213	680
Oklahoma	13	19	13	20	20	41	133	198	478	555	1,480
South Dakota	6	10	3	5	5	25	67	67	220	245	633
Texas	44	120	27	49	46	89	385	448	1,525	1,366	4,099
Wyoming	4	3	6	9	3	6	17	17	112	194	371
Total	119	262	75	128	144	300	1,091	1,231	4,106	4,504	11,960

Today, towns of 1,000 population generally show 25 to 40 different kinds of services; those of 2,000 inhabitants, 40 to 60; and those of 3,000, 60 to 80 kinds.<sup>3</sup> The small places (below 1,000 population) usually have fewer than 25 kinds of services. The number of types supplied depends upon location of the town with respect to main highways and larger towns, as well as population.

Most numerous are the little towns and villages—9,841 out of a total of 11,960 places listed for the region<sup>4</sup> have less than 500

<sup>3</sup> Dunn & Bradstreet.

<sup>4</sup> Includes unincorporated centers—Rand McNally Atlas.

people. Of these, 4,504 have populations of 50 or less; some are mainly social centers, with very few or no business services. Among

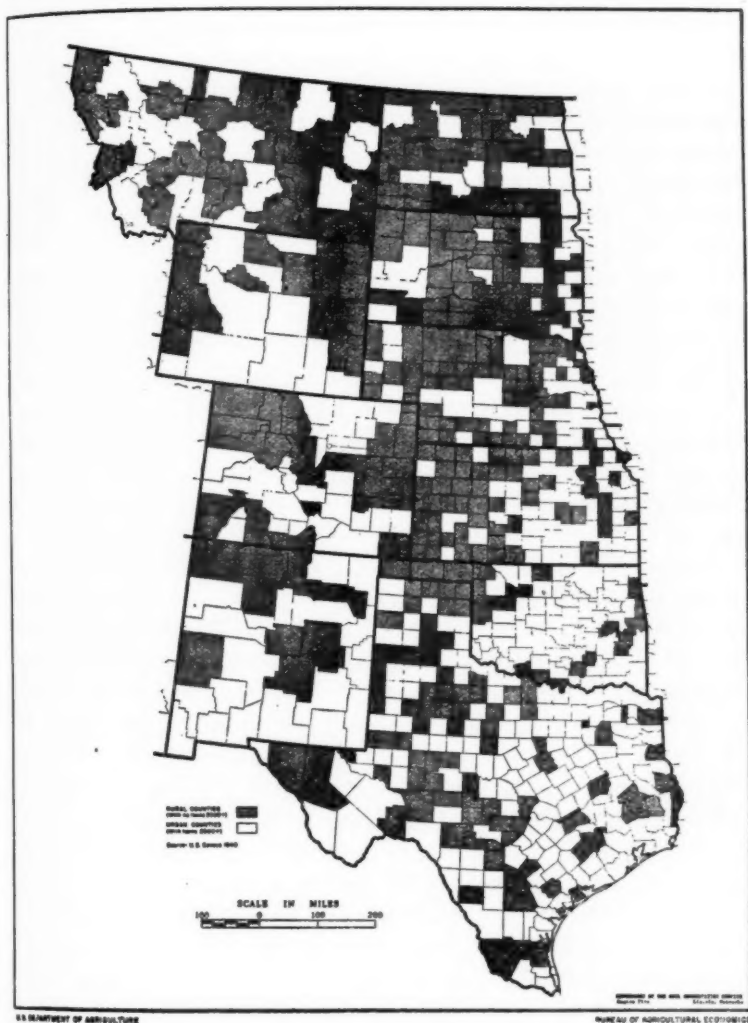


FIG. 4.—RURAL COUNTIES IN THE GREAT PLAINS (HAVING NO TOWNS WITH POPULATION OF 2,500 OR MORE—1940)

villages with 500 people or less are many important neighborhood convenience centers, however, and these correspond somewhat to

neighborhood business centers in residence areas of cities. Small towns of 500 to 1,000 are frequently important community centers with limited services. In many of these small towns and villages a new type of rural business specialization apparently is emerging. Farmers' cooperatives, especially those for farm marketing, are showing considerable vitality in small towns. With the better balance between people and land, and modern transportation, the role of villages appears to be changing. A differentiation of function may be in process, as the place of the village becomes increasingly that of a neighborhood center within a larger specialized service area.

In the smaller rural towns (less than 1,000 population) the common services are elevators, grocery or general stores, repair shops, gas stations, hardware stores, lumber yards, lunch rooms, barber shops, drug stores, beverage and confectionary shops, feed stores, cream stations, and farm-supply stores. These towns are school, social, and religious centers as well. From Texas to North Dakota, the grain elevator, the "skyscraper" of the Plains, dwarfs all other buildings in any small town and dramatizes the importance of agriculture in the community.

Towns of between 1,000 and 2,000 population have the services mentioned and in addition commonly have clothing and furnishings, garages, banks, variety stores, plumbing shops, one or more doctors, a dentist, possibly a furniture store, farm machinery, electric appliances, movies, etc. The towns of 2,000 or 3,000 people may have, also, a small hospital, hatchery, recreation parlors, flour mill, etc. In the latter towns, the range of goods and individual services is likely to be much greater. Schools, churches, recreation and other social facilities are often better organized in the larger towns. Communications with the larger area are likely to be superior, and more rural electrification is usually in evidence in the vicinity.

Services in all these size-categories of towns and villages reflect recent technological development and rising standards of well-being and convenience. Several lines of business have been added because of automotive transportation, in small towns as well as larger places. A wide range of electric appliances is retailed in relatively small population centers, and a growing number of farm families are within reach of power lines. On the other hand, modern transportation has closed hotels in small towns; clothing and furniture stores have gone out of many towns as families have easier

access to larger towns farther away. Thus, individual families are increasingly associated with larger towns, or cities, as well as with the local primary community centers.

### *Needed Research in Community Design*

During the past 15 years, the number of farm families in the Plains states decreased about 25 percent. The bewildering rapidity of that change has largely obscured the need for orderly adaptation of the residence pattern, communications, and service facilities. Although work has been done on perfecting ranch and farm organization, farmstead layout, ranch and farm homes, even on farm kitchens, little research has been done on community design; this despite the fact that many elements of modern living require group effort and community organization.

Recent population trends referred to above are due in part to external factors, but represent also an adjustment of farm and ranch size to a truly extensive type of agriculture dictated by the climatic conditions. Some of the adjustment has been by trial-and-error, and much of it has been costly in human resources. *Extensive* use of land resources presumably will always characterize the region. Even in the Missouri Basin states, where local areas are expected to be under irrigation, most of the area will be in dry-land farming and ranching. Indications are that a balance is now being struck between people and land, and that henceforth, the numbers of people in communities will change less.

As from a plateau, the people of the region can now view the experience of the last half century of change. They are aware that sparse population is a permanent characteristic—the editor of a North Dakota daily, in a conversation about post-war community re-organization, remarked, “It will be almost like rebuilding London.” Certainly ingenuity and invention of a high order will be required in the orderly adjustment of community life to the reduced farm population consistent with soil and moisture resources. How complex the adjustment process may be can be seen by recalling the history of the settlement period. Great numbers of people came in from eastern states, and from faraway lands, usually with concepts of farming and community life necessarily based upon experience in other environments. Moreover, a common saying was that people came in to improve the land somewhat until it had come

up in price, then sold and moved on. In some cases, the sole purpose of homesteading was to get title to the land, then to sell.

As the Homestead Act peopled the Plains during the last half of the nineteenth century, settlers established a grid pattern of farmsteads on the prairie; country schools stood at regular intervals, generally within walking distance of farm children; country churches dotted the landscape, often erected by settlers from other lands. The common assumption that towns would grow rapidly sometimes resulted in over-expanded community and business enterprises. Generally, community life and institutions were developed according to known patterns, and it was expected that the new communities would be copies of those back home—in Ohio, Iowa, or New England; or even in Sweden, Germany, or the British Isles. In time, it became apparent that the farms in Kansas and Montana would not be just like those in more humid areas, and that they must be larger than the original homesteads to give a chance for extensive farming. Dry years, singly and in series, told the settlers that something was wrong. Families moved out, giving a chance for consolidation of tracts into larger farm units. Meanwhile, mechanization was progressing, so that a family could operate a larger acreage. These factors gave impetus to the larger family farm concept, more consistent with the climatic conditions. But, from the standpoint of the community and its institutions, this was a fearful phenomenon, one more violent than any ever experienced in the entire settlement history of America. As the change in population went on, one segment of the community after another was severely tested. Farmers and small business men went broke, rural schools were closed for lack of children, and churches were abandoned.

Between the two world wars, far-reaching adjustments were made in the agriculture of the Plains. Today, according to production capacity studies, there is extraordinary uniformity in the ratio between resources and number of people in most counties in the Northern Plains states.<sup>5</sup> This is probably true in most of the Southern Plains, also.

Research in community design needs to take cognizance of the broad population zones associated with intensity of land use. The mapping of population density shows the broad social environment

<sup>5</sup> "Geographic Differences in Production in Agricultural Land in the Northern Great Plains," Ward and Green, B.A.E.



to which community life must be adapted. Community relationships and service facilities important in the level of living of rural people are conditioned by the number of persons per square mile. Three broad population zones illustrate different degrees of population density influencing social organization (see Fig. 1).

The most densely populated group of counties lies mainly in the eastern section of the region. It extends over half of Texas and Kansas, two-thirds of Oklahoma, one-fourth of Nebraska, and about one-fifth of each of the Dakotas. The only extensive areas in the western tier of states in the region are in northeastern and central Colorado. In such areas, efficient services and community life present the least difficulty. Here the total population ranges from about 25 persons per square mile to the relatively dense populations of urban counties. With farm inhabitants averaging six or more persons per square mile, and towns closer together, communities here are generally compact enough for efficient community life if services are well adapted. They need to examine their present facilities critically to make sure that technological advances and modern levels of living are available to the whole population on economical terms.

The second group of counties lies immediately west of the first zone, in an irregular pattern traversing the eastern tier of states, and in Colorado and New Mexico. Several counties of this density zone are found also in western Montana and in Wyoming. This area would seem to call for a modification of the traditional grid pattern of dispersed farmsteads. A pattern of line residences at two-mile intervals is visualized, and is apparently emerging in some localities. In this zone the range is from 100 to 300 square miles per 1,000 population. Farm population is three to five persons per square mile, an average of one family to each section of land.

The third group of counties predominates in Wyoming, Montana, New Mexico, the western parts of Texas and South Dakota, and the sand hill country of Nebraska. This area appears to call for realistic adaptation of institutions, services, roads and other communications, and a break with the traditional residence pattern of farmers and ranchers. With two or fewer persons per square mile, there is an average of two to ten sections of land per farm family. Towns are far apart and are usually small; counties average from 300 to 700 square miles per 1,000 people. Development of efficient community services presents real difficulties unless basic

adjustments are made. To be sure, the present investment in farm buildings, community structures, roads and other communications makes precipitate changes in the residence pattern costly. Town farming, dual residence, and other innovations appearing in many localities, however, suggest that adaptations are under way. So far as possible, farm or ranch headquarters should be located where advantage can be taken of surfaced or graded all-weather roads giving access to needed services. As farm and ranch people adopt higher standards of rural living, traditional concepts of farm and community life may well have to change progressively until they fit the environment.

In using for illustration the three population density zones described, it should be noted that topography played an important part in the settlement patterns. Many compact communities are found along streams and in watered valleys of generally sparse counties, especially in the four western states of the region. If detailed population data were utilized, numerous small areas would be classified with those more densely inhabited. This would also reveal areas of even more sparse settlement. Compact communities are interspersed with meagerly settled range and forest lands, and in some cases are provided with relatively good communications.

Farms and ranches are dominant in the Plains economy. *A high proportion of farm people in the population* has special significance in sparse areas. There, farmers and ranchers are not in sufficient numbers to support services within a reasonable radius for convenience. Educational and health facilities, for example, are relatively remote from a large proportion of the families. Nine counties have 80 percent or more of the population on farms; 50 counties have 70 percent or more on farms. Many of these counties are in the sparsely settled areas. Villages are small and their facilities are usually limited to a few of the primary services. About half of the 826 counties in the Great Plains states have more than 50 percent of the population living on farms.

Most of the 15,000,000 people of this region are directly or indirectly concerned with agriculture—farming and ranching. This sets the pattern of the population distribution. Other industries are important in this respect, in localized areas, but farming and ranching make up the main business. This is not to say that a majority of the families are engaged in agriculture. Actual farm popu-

lation, by counties, ranges from less than 20 percent to 50 percent of the total. But the non-farm population in the region as a whole is for the most part associated with servicing farmers and ranchers, and with the marketing or processing of agricultural products. Thus a map showing total inhabitation looks remarkably like that in Fig. 1 showing farm population density. A few exceptions are the local areas of the extractive industries—mining and petroleum.

An increasing number of social scientists in the region are interested in the unique problems community life presents in sparse sections and many have had an opportunity to observe at first hand. Experience is not entirely lacking, as individual farmers and ranchers are experimenting and improvising in many ways. Communities, also, are trying new things, and indeed some have adopted practical innovations. The data assembled in this paper merely point up the issue, and raise questions for further investigation. These have to do with feasible residence arrangements better adapted to the environment; adjustment of services to a widely dispersed population dependent upon small towns; the relatively high cost of essential services; and a critical lag in the adaptation of facilities to the conditions of the Plains.

1. *To what extent are social considerations beginning to compete with economic ones in the behavior of Plainsmen?* An increasing number of farmers and ranchers have year-round or winter residences in "town," to give access to schools, electricity, sanitation, recreation, and other living advantages. Some are moving headquarters to the vicinity of towns if not within them. Others keep two residences so the family can be near town schools, especially in winter, while the operator commutes when work and weather permit. Still other ranchers and farmers are moving headquarters to all-weather roads for the same reason. Here electricity is available, and mail service is uninterrupted; here children may be driven to schools, or picked up by bus. Winter storms and drifted roads, or mud, isolate many ranches and farms for days at a time; and families are increasingly thinking about ways to alleviate isolation and to enable them and their children to participate in the advantages commonly taken for granted in more densely settled areas. In some localities there is what appears to be the emergence of a "string" community. Farmers and ranchers in some sections are working through county planning committees, which include the County Commissioners, toward better but fewer roads. They visual-

ize a modern county highway system, which will disregard the obsolete grid pattern and maximize communication facilities for the families now on the land. Were farmsteads located more rationally, the road system could be greatly reduced and better highways could be provided. What efficiency of design can be introduced into community life by a more realistic residence pattern, to lower costs of highways, schools, power lines, telephone lines, health facilities, etc., to individual families over a period of years? What are the main institutional and other obstacles? What are the costs and the social and economic benefits?

2. *Can adaptation of institutions approximately compensate for the distance factor in sparse areas?* Many needed services present difficult problems. The present per pupil cost of *schools*, for example, makes the education of children expensive. Most of these states are well above the national median in percentage of income of all citizens allotted to school support, yet conditions in large areas make for small and inefficient schools. Districts need to be large enough to provide desirable attendance areas, in terms of pupils, financial resources, and effectiveness. But distance is highly important; and somehow efficient community high schools for limited enrollments must be developed. Some of the more sparsely settled counties, where distances are great and roads are poor, have no *doctor* in the whole county. In the 10 Plains states nearly 10,000 of the 12,000 population centers have less than 500 inhabitants. Very few of these small towns have a local doctor. Forty-five percent of the counties have only towns of less than 2,500 people. There are few hospitals in such villages. The cost of maintaining all-weather roads is at present prohibitive in many places. Occupied farmsteads are distributed thinly and haphazardly over the landscape. Farmers and ranchers in such areas do not fully enjoy the advantage of modern transportation, and this conditions the activities of isolated families in many ways. Many other problems of these areas have institutional aspects having to do with local government, relations with county, state, and national government, town and country relations, inter-community cooperation, religious and cultural activities, etc. Again, what are the main obstacles to regional adaptations? What are the approximate costs, and the social and economic benefits of needed institutional adaptations?

3. *Can a population dependent upon small towns and villages for most community facilities have parity of services?* Because towns as

well as families are far apart in thinly populated areas, many people must depend chiefly upon small service centers. Such communities need special arrangements if the members are to have access to services approximately on a par with those near larger towns. Retail and service enterprises as well as public facilities need to be such as the community needs, and will support, in the interest of convenience. Some new type of area organization, which relates a constellation of small towns to a more specialized service center, suggests itself. Perhaps a new type of business specialization adapted to rural villages would promote a functional relationship between small and larger towns in such areas. Distinctive small high schools designed as community schools, where distance limits enrollment to 75 or 100 students, might be feasible. Perhaps a health service could be organized to assure local emergency clinic care in the small community, as a part of a larger area organization, focused in a well-equipped and readily accessible county, city, or area hospital. How can such communities best organize to minimize the disparity in community facilities? What are the main obstacles to such organization? What new forms of organization would be needed and what are the social and economic benefits?

4. *How can the introduction of irrigation contribute to reorganization of community life?* One of the persistent problems of the region is that of getting modern services within a reasonable radius for convenience and economy. While the development of Missouri Basin irrigation projects will involve only a small proportion of the land area, it will assuredly alter the distribution of the farm population in several of the states. Maps of proposed irrigation show that the new irrigation areas will be scattered widely over several states. Probably it will not offset recent population losses in any of the states, but local increases are anticipated. It is estimated that the development will ultimately add about 10 percent to the total farm production of the Basin, which implies income increases in the affected communities. Presumably, the next 20 years will be a period of change in this part of the Plains. The communities and states involved can take advantage of this in modernizing services and community life. Towns in and near new irrigation areas should grow moderately, even without local industrial development. If irrigation is integrated with dry farming it will have the effect of spreading the benefits to a maximum number of farmers. How can community development, incident to such improvement, follow

a design which will also put modern facilities within reach of the greatest possible number of dry-land-farm families? As towns in irrigation areas expand population and facilities, some of the service and market benefits will obviously extend to dry farmers in the vicinity. How can the "reach" of these by-products of the great irrigation installations be maximized? Such contributions of the Missouri Basin development to social efficiency might in some cases be at least as significant as the added agricultural production.

There are, of course, important irrigation developments outside the Missouri drainage area, in Colorado and in local areas of Kansas and New Mexico. In most cases, these have had an impact on community life. When the objectives include maximum social benefits as well as better utilization of land, the value to the area is greatly enhanced. Other things being equal, projects designed for social efficiency will yield more benefits per dollar, and will be more stable and successful.



## LAND AND WATER DEVELOPMENT PROGRAMS IN THE NORTHERN GREAT PLAINS

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**T**HIS paper will examine some of the problems involved in public development of resources. Other papers in this series deal with the problems of individual farmers in developing resources. The problems of a local, state, or federal unit of government in the field of resource development are quite different from those of the individual farmer.

Governmental programs encounter many of the same physical problems in developing resources as do individual farmers. Many of the economic problems of maximizing returns are also similar. Of course, the public program takes into account benefits that the individual cannot consider. The public program, likewise, has costs that an individual can ignore because they fall on someone else. Funds may be available at lower cost to public programs.

It is in the field of organization that the great difference exists between the public and the individual approach in resource development. The Plains has been a fertile place for developing new concepts and ways of doing things. Old methods have been adapted and modified. New devices have evolved from old. The purpose of this paper is to review some of these institutional and organizational adaptations that have been made to achieve resource development under the conditions peculiar to the Plains area and to outline further changes that may be needed.

For certain descriptive purposes in this paper, the Northern Great Plains area is considered to include about 235 million acres in North and South Dakota, Nebraska, Kansas, Montana, and Wyoming. It is bounded on the west by mountains, on the south by the southern boundary of the Missouri Basin, on the east by the indefinite rainfall line between the Plains and the more humid prairies, and on the north by the Canadian boundary.<sup>1</sup> The Northern Plains, thus defined, contain about 265 thousand farms, which

\* The views herein expressed are those of the authors and are not necessarily those of the Bureau of Agricultural Economics.

<sup>1</sup> See Fig. 11, page 51 of the "Missouri River Basin Agricultural Program," House Document 373, 81st Congress, 1st Session, for an outline of the area used. The report also gives a good description of physical and economic conditions and problems in the Northern Plains.



include about 206 million acres of land. Of this total, about 76 million acres are used for production of crops, with corn and wheat of major importance. In 1944, farm income amounted to 1.4 billion dollars, about half of which was from the sale of crops. The 1945 value of all farm property amounted to 4.3 billion dollars.

### *Problems*

The more serious problems of the Northern Plains are those which arise from these characteristics: (1) instability of farm income due in part to weather factors, (2) sparse population, and (3) soil depletion.

Instability of farm income and even the high variability of crop production result from many factors. Instability of income is, of course, due to a considerable extent to price fluctuations. Equally important in the Plains, however, is variation in production. Perhaps the most important factor in production variation is soil moisture available for plant growth. Of great significance, too, are such factors as insect damage, crop diseases, floods, high winds, and hail storms. In some cases during the 1930's, for example, grasshoppers caused more loss in production than drought.

Instability of farm income is a more serious problem in the Plains than in many other areas for two fundamental reasons: (1) fluctuations are greater in the Plains and (2) the economy of the area is predominantly agricultural. If farm income is down, the whole economy is down. The characteristic of variability in the Plains is commonly believed to be the basis of many of the social and economic problems of the area. It is the basis, for example, of overcapitalization of land during high-income periods and the resulting distress in low-income periods.

Sparse population may be considered a problem in the sense that it makes the establishment and maintenance of community facilities difficult. The per capita cost of schools, churches, and recreation centers is high. Costs of electricity and telephones are so high per person that residents often do without them. The problem of road maintenance is likewise more difficult. Tax delinquency in the 1930's resulted largely from the attempt to carry a high-cost type of local government and community services imported from the more humid area. The effort to solve this problem has brought about many improvements in local government and may eventually result in a pattern adapted to the sparse population of the Plains area.

Erosion conditions vary greatly in the Northern Plains. Roughly half of the Western Plains is made up of moderately sloping or level land where natural erosion is slow but where wind erosion has been accelerated by intensive use. The remaining portion of the Western Plains is composed of rough lands and badlands, sandhills, and hilly and mountainous areas. Erosion of the rough lands, badlands, and hilly lands is rapid even under natural conditions. When they are misused, this process accelerates in the sandhills and mountainous areas. A large portion of the Eastern Plains is made up of level land and undulating glacial drift. A major portion of the remaining area is moderately sloping land with only relatively small proportions of hilly and sandy lands. Thus, water erosion is less of a problem in a large part of the Eastern Plains.

But the entire Plains area has the basic problem of maintaining organic matter in soils. So far a cropping system has not been developed which will maintain the organic matter content of the soil. Besides the loss of fertility, this leads to an increased hazard of both wind and water erosion.

#### *Resource Programs Originating in the 1930's*

In this section experience with institutional adaptations in various resource developments is reviewed and some of the problems that may be encountered in developments proposed for the future are described.

*Rural public works in the early 1930's.*—During the 1930's it is estimated that well over one billion dollars of federal funds were expended in the Northern Plains States for various types of farm relief. Much of the loan portion of this fund was paid back during the prosperous period of the 1940's but the cost of the drought and depression was high. In many areas, most of the farm families were forced to seek some form of relief, either loans or work relief.

There was much difficulty in finding suitable rural public work projects in this period. Little planning had ever been done. No local organizations were concerned with resource development. Emphasis was on providing jobs, and few projects provided suitable work for farm people. Transportation was a problem. Farmers had chores that did not fit in with work on projects miles away.

Another problem was involved in spending public funds to improve private land. The prevailing concept had been that public funds must be spent for public purposes on public lands only. The simple solution of paying farmers to carry out necessary improve-

ment measures on their own land was difficult to accept. Most of the land in the Plains was in private ownership. Many small tracts were held by private non-resident owners; this was a hangover from the homestead period.

Under these circumstances many rural projects were built that were not well adapted to prevailing conditions. Sometimes the resulting facility was not needed and usually there was no provision for maintenance. CCC camps and WPA projects sometimes concentrated labor so that projects of the "hand-labor" type developed. The difficulty of getting relief money to rural people who needed it and yet requiring that some form of work be done in return often resulted in charges of "leaf raking." Frequently there existed the dilemma of a unit of government sponsoring a project yet not having the necessary funds for supplies, equipment, and supervision.

As a result of all these difficulties and the general lack of precedent and of knowledge as to what might be done, full effectiveness in the field of resource development was not achieved. The obstacle was not in lack of funds except for some necessary local contributions. It was the dearth of effective ideas, organization, and other institutional arrangements to get development of resources planned and implemented.

*Conservation payments.*—Several concepts and resource programs had their origin in the difficulties of the early 1930's. The idea of conditional grants—that is, grants by the government to farmers who carry out certain practices or meet such other conditions as may be specified—was devised as a means of inducing conservation on privately owned land. Although a wide variety of grants had been used to secure state cooperation in different lines of work, grants as a means of directly impelling action on the part of farmers were authorized first in the Soil Conservation and Domestic Allotment Act in 1936.<sup>2</sup>

The conditional grant or conservation payment has become a useful tool in achieving conservation in the Plains area. For example, conservation payments were used to get temporary wind erosion control by paying for emergency tillage. This was followed by strip cropping, improved rotations, and the restoration program. A large acreage was seeded to grass under the restoration program.

<sup>2</sup> Wells, O. V., Cavin, J. P., and Myer, D. S., "The Remedies: Direct Aid to Farmers," *Yearbook of Agriculture*, 1938.

Another popular use of conditional grants was for stock water development. Water for livestock was critically short during the drought, and assistance on this measure resulted in considerable development in the range area. In more humid parts of the Plains, payments at first were for cropping practices. The tendency has been to shift more and more to permanent conservation measures and to put less of the payments into annual practices which, although valuable, should be carried out by the farmers' own initiative and funds as a part of good farm management.

Considerable progress has been made with this device but several economic problems arise in the use of grants for conservation measures on private lands. Involved in this method is the question of selecting appropriate conservation practices and determining what portion of the total cost the federal government is justified in paying. Use of public funds for conservation payments should be guided by appropriate economic criteria to avoid uneconomic use of resources. Certainly much more economic research is needed on both aspects of this question.

*Local districts.*—Various local district devices were developed to enable the people to take more responsibility in solving their resource problems. In the range areas of the Northern Plains there was a diverse land ownership pattern and it was difficult for ranchers to get control of sufficient land for economic units. This led to the formation of grazing districts. The major purpose of these districts was to acquire control of grazing land and to distribute the use among its members. Some development was done such as fencing and livestock water; and some control was exercised over the rate of grazing. The first district was formed by special act in Montana. Later most of the Northern Plains States passed grazing district acts and there were many local variations of this form of cooperation.<sup>3</sup>

The concept of the soil conservation district as a device under which the initiative and actual work of conservation could be undertaken by land operators themselves probably grew out of the earlier experience with grazing districts in the Northern Plains and with wind erosion districts in the Southern Plains. It was agreed that

<sup>3</sup> See Stanley W. Voelker, "Legal Provisions for Cooperative Grazing Associations in the Northern Plains States," BAE, Lincoln, Nebraska, December 1943. Also C. W. Loomer and V. Webster Johnson, "Group Tenure in Administration of Public Lands," Circular No. 829, U. S. Department of Agriculture, Washington, D. C., December 1949.

individual efforts to control erosion were likely to be ineffective, in some cases because of lack of technical knowledge, finances, or equipment; in other cases, because one man's failure to protect his fields may have nullified the efforts of his neighbors. A mechanism was needed whereby farmers or ranchers could organize for community action in combating soil erosion. State and federal representatives agreed that this required state legislation with the following considerations:<sup>4</sup>

(1) A genuine attack on the erosion problem requires more than the construction of terraces and dams. Land use practices and cropping programs must be adjusted in many cases.

(2) Practically all the lands in particular watersheds must be brought under uniform control. Arbitrary boundary lines should be ignored and programs formulated over naturally bounded areas.

(3) A program can be made effective only if farmers can be induced to cooperate voluntarily. Therefore, machinery should be set up which farmers can use when they are convinced that action is desirable. Some means should, however, be provided whereby a majority of the farmers can vote conservation ordinances upon themselves and thereafter compel a recalcitrant minority to comply where it is for the public good.

(4) The farmers must be able to feel that the program is largely in their own hands. The only way to induce this feeling is to do just that.

(5) Because of the wide variance in conditions within a single state, conservation ordinances must be formulated locally and must be flexible.

(6) In cases where the results of land treatment increase the public welfare and social good the costs of the operations should not be thrown wholly upon the land owners or operators.

President Roosevelt recommended a Standard State Soil Conservation District Law containing these principles to the various state Governors on February 26, 1937. All states in the Northern Plains adopted some version of the Standard Act and a large percentage of the area is now in districts. Under certain conditions local districts enable government technicians to spread their efforts. Soil conservation districts as local units of government could serve as resource development project sponsors and thus help solve the problem of public expenditures on private land, in periods like that of the early 1930's. In several states Districts have authority to enact local land use regulations. These have not been used to any extent as yet but, as conservation is applied to a higher proportion of the land and there is pressure to complete the job, they may be

<sup>4</sup> "State Legislation for Better Land Use," U. S. Department of Agriculture, April 1941.

come important. Soil conservation districts have possibilities for providing for maintenance of major installations, but they are limited by the fact that in most cases they have no authority to raise funds by taxation. In other words, they would depend upon voluntary contractual arrangements.

There has been a tendency to confuse soil conservation districts and the Soil Conservation Service, perhaps to the detriment of additional assistance to the district program that might have been available. Possibly the warning sounded by early students of the program has been overlooked.

"The very size of the (district) program and the speed with which it has developed have resulted in some misconceptions as to its nature and goals. A fundamental premise in the districts' approach is that the districts must be independent, autonomous units of government, through which farmers and ranchers may determine their own policies and programs. It is highly important therefore to establish a clear-cut line of demarcation between the functions of cooperating agencies in assisting the districts and those of the districts themselves."<sup>5</sup>

*Submarginal land purchase.*—The submarginal land purchase program was established to buy out settlers and private owners in areas not suited to close settlement or cropping use. Public ownership had long been advocated for this type of land. It was thought that such a program would help to solve the local public finance and land use problems and that it would aid with the surplus production problem, as well. Many of the concepts used in this program were modeled after the experience with National Forests. When first started the program was very popular because of the large extent of land in distress ownership. Many owners were anxious to sell at the government's appraised price. Several projects were established in the Northern Plains, and now about 4,600,000 acres are in public ownership as a result of the program. Most of the crop land acquired has been seeded to grass; and the grazing land is leased through local conservation or grazing districts. The land purchase program was operated at first under emergency funds, but later the Bankhead-Jones Act provided Congressional authorization and regular appropriations.

As higher farm income returned to the Plains, major land purchases were discontinued. The program made some desirable ad-

<sup>5</sup> "State Legislation for Better Land Use," page 42, U. S. Department of Agriculture, April 1941.



justments but the method of land acquisition and management is somewhat inflexible for variable Plains conditions. Local people do not like to see land removed from the tax rolls even though payments are made in lieu of taxes. There is always a certain amount of pressure against keeping land in public ownership.

*The Case-Wheeler Program.*—The Case-Wheeler Act<sup>6</sup> was based on the concept that complete settlement and immediate utilization of the project lands and irrigation facilities are not possible without predevelopment of the land by the government for irrigation farming. The land was to be purchased and developed prior to settlement and resold in family-size farms. Where this is done, all the irrigable land can be quickly brought into production. Without land development many irrigation projects have required years for complete settlement and crop utilization.

The value of a complete physical inventory of the land and soils, the anticipation of conditions that will exist after irrigation water is applied, and the sub-division of land to effect the fullest utilization of a land area, are being tested on Case-Wheeler projects. As they were originally conceived relief labor was used in development work. During the war some projects were continued as War Food programs. At present no new ones are being started although some work is being done on those already existing.

While the future of this type of activity is somewhat uncertain because of the increase in irrigation proposed in the Plains, the need is even greater. Furthermore, the problem in proposed irrigation areas is more complex because of the existing ownership and operating pattern under dry-land farming. The Case-Wheeler method of purchase, predevelopment, subdivision, and resale does not seem to be entirely acceptable under these conditions. However, no new methods have been devised.

*The Water Facilities Program.*—This program, established by the Pope-Jones Act of 1937, was designed to assist through technical service and credit the development of individual farm irrigation systems, or those for a small group of farms. It was intended also to help secure satisfactory domestic and stock water supplies, which is a problem in many areas. Because of administrative rulings, credit was extended only in case other credit sources were not available. Experience with the Water Facilities Program should be help-

<sup>6</sup> Public Law 398, 76 Congress, Chapter 717, 1st Session, S. 1802.



ful in devising a program of development credit for all types of land improvement.

*Shelterbelt Program.*—A program developed during the early 1930's was for the planting of shelterbelts and windbreaks. This program also used relief labor. Tree planting on the Plains had been undertaken with various kinds of government aid since the first days of settlement. Early plantings for protection of farmsteads were followed by more extensive efforts to produce timber and to protect fields. The shelterbelt program of the 1930's was a cooperative effort of the federal government, state agencies, and farmers, and resulted in a greatly accelerated rate of shelterbelt plantings. Although the special program has been discontinued, this activity has continued albeit at a reduced rate. Interest in windbreak and shelterbelt planting is widespread throughout the Plains.

*Other programs.*—Many other methods were found to promote resource development and management. In Nebraska, special state-enabling legislation provided for Public Power and Irrigation districts which made extensive hydro-electric power and irrigation developments, using WPA and PWA funds. In other states, for example Montana, a State Water Commission was established to develop irrigation water supplies, again making use of relief funds. In the Dakotas and Montana several million acres of land became tax delinquent. Considerable change was made in state law and in administrative procedures to bring this land under control and management during the time it was in county ownership.

These are examples of adapting or devising organization and methods to solve resource development problems. The 1930's brought many lasting changes, but some devices have fallen into disuse. The war prosperity discouraged some types of group action and enabled individuals to acquire controls that had not been possible before. For example, in some grazing districts land that formerly was leased through the district has been bought by members. In other areas public pressure forced counties to put up land for public sale which had been under lease to grazing or conservation districts.

#### *Programs Originating in the 1940's*

Future resource development in the Northern Plains will be vitally affected by the Missouri River Basin Program. The Northern Plains area comprises about two-thirds of the Basin. The

Plains are a transition area between the lower and upper parts of the Basin. In a real sense the Basin program may be said to have originated in the Plains.<sup>7</sup> It was here that the Army program from the East and the Reclamation program from the West came together. It is in this transition zone that we are having to face the problems of alternative uses of water. The proposed agricultural program is also in many ways a product of the Plains area. Past experience with regional problems in the Plains, especially the work of the Northern Plains Council, provided the background for the proposed acceleration of agricultural programs in line with the step-up in flood control and irrigation work. Federal-state cooperation in agricultural work also provided the organization that was used to develop the plans for the Agricultural Program.

*Pick-Sloan Plan.*—The Flood Control Act of 1944 authorized the Pick-Sloan plan. This program provides a system of reservoirs on the main stem and tributaries of the Missouri River. Water storage in these reservoirs will be used for irrigation, power, navigation, and other purposes. Storage is to be supplied in each reservoir for flood-control needs. In addition, towns and agricultural areas will be protected by levees.

A water supply is to be made available for about five million acres of new irrigation and an additional amount is to be available to about two million acres now irrigated. Stored waters are to be made available for domestic and industrial water supplies and pollution abatement.

Of the 150 reservoirs proposed in the Pick-Sloan plan, 82 are located in the Northern Plains area. They would furnish a water supply for 4.5 million acres of land out of the 5.2 million proposed for new irrigation. A major share of the presently irrigated land to receive supplemental water is also in the Plains area. On land proposed for new irrigation, it is estimated that about 17,300 dry-land farms would be benefited. In addition the number would increase by about 14,500. This would come from subdividing existing dry farms as they were irrigated. About 13,600 presently irrigated farms in the Plains area would receive a supplemental water supply.<sup>8</sup>

<sup>7</sup> It is interesting to note that the sponsor of the first basin-wide development, Senator Norris, came from the Plains area.

<sup>8</sup> Henderson, Sidney, "Changes in Crop Production Anticipated from Proposed Irrigation and Reservoir Development in the Missouri River Basin," USDA, Bureau of Agricultural Economics, February 1950.

These are some of the major features of the Pick-Sloan plan in the Plains area. Others include the generation of electricity in some of the larger reservoirs, flood protection in some localities, municipal water supplies, and development of recreation.

Development of an area as large and as diverse as the Missouri Basin poses many problems. Some of these are:

(1) Selection of appropriate economic criteria for evaluating resource development proposals.

(2) Reconsideration of federal policies as to division of costs. Some of the costs are charged in relation to benefits; others are not reimbursable and are paid out of general appropriations. Costs and benefits do not always accrue equally in the same area or to the same group. For example, people who live in a proposed reservoir site or in a community nearby may be asked to bear considerable cost without sharing in the benefits of flood protection or irrigation downstream. Irrigation farmers are expected to repay a portion of the costs of providing water for their lands; on the other hand, lands protected from floods are not charged with any construction costs. It is contemplated that power will be sold at rates high enough to pay for its share of the cost and to contribute to repayment of irrigation expenses. In the over-all Basin development it is proposed to pool costs and benefits. Excess advantages from one part of the development may be used to justify other parts. In the same way, reimbursable costs may be pooled. The surplus from one project may be used as payment on the other. This proposal is based on the concept of joint costs and benefits, but in many cases it is difficult to show that such a relationship exists.

(3) Study of reservoir impacts in the densely settled areas. Local people are greatly concerned about the problems of moving and disruption of community activities.

(4) Planning new irrigation in areas which in some years have bumper crops without it. The problem is to plan irrigation so that it provides the maximum economic insurance against crop failure, recognizing that there are both wet and dry periods.

(5) Collection of more data on (a) which soils are suitable for irrigation, (b) what to expect from irrigation in a subhumid area, (c) how to adjust from dry-land operations to irrigated farming.

*Missouri Basin Agricultural Program.*—The Missouri Basin Agricultural Program was prepared by a U. S. Department of Agriculture field committee with the active participation of Land

Grant Colleges and other state and federal agencies. It is (1) an inventory of conservation and development needs and (2) a plan for the complete treatment of critical watershed or problem areas.<sup>9</sup> This includes watershed treatment, rehabilitation of existing irrigation, and development of new irrigation. This is in contrast to current agricultural programs which are carried out rather uniformly throughout the entire country. The program includes such measures as the following types:

- (1) Seeding 20,000,000 acres to grass and legumes.
- (2) Reseeding 17,500,000 acres of depleted range.
- (3) Terraces, contour farming, grassed waterways, and other measures to retain water and reduce erosion.
- (4) Stabilizing measures for small water courses to assure safe disposal of water.
- (5) Two hundred forty-five thousand miles of shelterbelt and 750,000 acres of windbreaks.
- (6) Four hundred thousand stock ponds.
- (7) Assistance in rehabilitation of existing irrigation projects and technical and direct aid in developing new irrigation.

The agricultural program will be accomplished, in the main, by encouraging farmers and private owners to protect their land from erosion and depletion, to make improvements, and to manage the land in a way that will accomplish the objectives of the program. In making and applying practical conservation plans, farmers, ranchers, and land-owners will have available to them the best technical assistance that can be furnished by the federal government in cooperation with the appropriate agencies of the states. In addition, farmers, ranchers, and landowners are to be reimbursed in part for the cost of the initial installation and the application of various measures and practices. This employment of public funds is a further extension of the concept of conditional grants. Partial reimbursement recognizes that many benefits accrue directly to the public from these installations and practices. Among these

<sup>9</sup> Secretary of Agriculture Memorandum No. 1220, July 8, 1948 provided for the preparation of an Agricultural Plan for the Missouri Basin. The plan was prepared by a U. S. Department of Agriculture Field Committee made up of representatives of various bureaus. This group had the active cooperation of representatives of the Land-Grant Colleges and several other state and federal agencies. The report, entitled "Missouri Basin Agricultural Program" was sent to Congress on September 29, 1949, with a recommendation by the Secretary that the program be authorized. Identical bills H. R. 8356 and S. 3568 have been introduced to authorize the program.

advantages are conserved resources, flood control, better water supplies, enhanced recreational opportunities, and reduced need for public assistance in the event of adverse weather. In some instances, new installations and practices will require major adjustments in farm operations and the temporary loss of farm income.

The operating phases would be supported by research and investigations, soil surveys and land classification, education, and credit.

The Agricultural Program, as well as the other resource programs already discussed, has the problem of appropriate criteria for economic evaluation and division of cost. In addition, in carrying out the program these problems should be considered:

(1) Provision for maintenance. The program envisages extensive local contributions in the installation of projects and even heavier participation in their operation and maintenance. This will take responsible local organization. It will require a source of funds if local districts are to maintain and operate extensive developments.

(2) Getting participation of landowners and operators. This is important to make a concentrated program effective. People must understand the program and must be willing to furnish their contribution in cash, labor, or foregoing income.

(3) Making land use adjustments. A drastic change in land use is required in areas in which land is of such low quality or so erosive that it cannot be cropped indefinitely, although at present crop production may be more profitable than diversion to grass. Usually, the change in land use will need to be accompanied by an increase in farm size.

### *Summary*

This review of resource development programs during the last two decades indicates that we now have a better idea of problems and of the things that can be done to meet them. This experience would be especially helpful if another drought and depression came. Many proposed projects could not be started until after a period of detailed planning, for which the basic data are inadequate. But concepts and public awareness of the possibilities of resource developments are not lacking as in the early 1930's. Perhaps it might be well to concentrate now on collection of basic data on our land and water resources and to prepare detailed plans of projects. Only the more favorable or urgent projects might be undertaken in this period of relatively full employment for labor and other

resources. The less favorable projects in the various programs might well be deferred until a period comparable to the 1930's when labor costs little and worthwhile projects are desperately needed. Another argument in favor of pushing resource development in periods like the 1930's is that while the necessary accompanying private investment is hard to obtain, it is almost certain to be profitable.

A second observation is the rapid and widespread growth in organization for resource management. We now have organization and competent staffs at both federal and state levels to plan and carry out programs of resource management and development. We have the machinery for furnishing financial aid in the form either of loans or grants and for seeing to it that the job is done. Locally we have districts, county and community committees, and other types of organizations that are set up for the work of resource development. Compared to the 1930's, great strides have been made in organization for resource development. But compared to the task ahead, as laid out in plans such as those for the Missouri Basin, organization and methods at all levels are inadequate. The problem of coordination of large programs is tremendous and is never finally solved. They get out of balance or out of timing with each other and in relation to national needs. Locally, we have not solved the operation and maintenance difficulty.

Finally, some programs or devices that appeared to have great promise during the early 1930's are losing ground, even though the problems they were set up to solve remains. These situations need special study.



## BASES OF ADJUSTING INTERNATIONAL TRADE IN FOODSTUFFS

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**T**HE best way to start an analysis of this subject is to point out that if the world ever gets into the state where its food producing and other resources are equally developed everywhere, and no barriers to trade are interposed, the United States will be a large exporter of food, for the simple reason that it has within its borders much more than its share of the fair to good and excellent agricultural land of the earth in proportion to its population.

Moreover, in the period from 1900 to 1919 when trade in foodstuffs and fibers was still fairly free, something more or less approaching this state existed. From this point of view, it is pertinent to divide the period from 1910 to 1940 into three periods: 1910-19, 1920-33, and 1934-40. In the first of these periods, during and prior to World War I, the United States enjoyed a fairly good export market for agricultural commodities. As a result, when we had large crops of wheat or corn, we could ship the wheat or the pork products abroad, primarily to Europe. This not only brought money to the farmers directly, but it kept up the domestic price of these commodities. The demand for farm products generally was much more elastic because of these export outlets than it would have been without them. In consequence of this, the large outputs of some years—such as 1910, 1911, and 1912—sold for a fifth more purchasing-power dollars per capita than the low outputs of other years—such as 1916 and 1917. The favorable influence of the export market extended to all agricultural groups, whether producing for export or not. These export outlets lessened the competitive pressure on the farmers who would normally not produce for export market.

After the close of World War I, the picture changed. The war provided a great incentive to self-sufficiency in the European nations. Our exports met increasing resistance and competition. Even when we were able to sell abroad, it was only at low prices. Also Canada, Australia, the Argentine, Brazil, Egypt and other areas

\* This is a revision of a paper presented on May 5, 1950, at the Annual Meeting of the Food Industry Advisory Committee of the Nutrition Foundation.



provided an increasing share of Europe's needs for wheat and cotton. As a consequence, the large outputs no longer sold for more purchasing-power dollars than the low outputs.

After 1934, the situation became worse. The importing countries passed restrictive legislation to support their depressed agriculture. In some countries, after 1936 there was a tremendous rush for self-sufficiency in anticipation of the coming second world war. Our own New Deal agricultural program did not encourage exports. In years when our output was relatively large, as in 1937, 1939, and 1940, it brought a total income slightly less than when it was very small, as in 1935 and 1936. The elasticity of foreign demand for United States farm products had in effect shifted so that large supplies had to sell at very low prices in order to move.

It thus appears that the farmers of this country have a strong interest in an open market abroad for their products. Given such a market, they do not need to be afraid of ordinary so-called surpluses. It is because they have lost such a market that large outputs depress their prices so much.

World War II worsened rather than improved the world situation in this respect. Of course, one needs in this matter to distinguish between the immediate postwar and the later situation. In the years from 1946 to 1948, the agriculture of many of the countries was still suffering from the setbacks of the war, and food exports were temporarily large. The United States and the British Empire countries have been supplying this food under several types of special arrangements, including the Marshall Plan, military shipments to occupied countries, and term contracts at special prices. But the programs for most of the receiving countries in the years ahead call for making them more self-sufficient in food and fibers than they were before the war. Thus the United Kingdom has set its goals at producing more than half its food supply as compared with a third before the war. The Marshall Plan countries are trying hard to be ready to feed themselves largely without our food exports when in 1952 the ECA dollars will no longer be available, if present plans continue.

The general situation in these countries is that they cannot buy from the hard-currency countries unless they can export to them, and these exports will mostly have to be industrial products. This situation is complicated by the fact that Western Europe obtained considerable food and animal feedstuffs from Eastern Europe before

1940. If the present East-West barriers are maintained, Western Europe will have to choose among three things: (1) producing food itself, (2) doing without, and (3) importing. It will do some of all three, but what it imports will come as much as possible from soft-currency countries and from Africa and the East Indies. It will barter rather than buy outright whenever possible.

Other countries besides those of Western Europe are much affected by the aftermath of the war. In the Middle East, Greece and some others are shut off from former supplies of food in Russia and countries behind the Iron Curtain. We may continue for a time to ship them food for political reasons, but this is not a real solution.

The first major question to answer about the situation which I have just described is whether we can afford to let it ride? Or is it highly important that we do something about it?

Most of us, I have no doubt, would be happier if we could let it ride. But to pour out hundreds of billions of dollars in fighting world wars, and send our young men by the millions to battlefields in all corners of the earth in order to keep our own country safe and free, and then let the very thing we fight for in war be lost in peace, or in cold war, seems to be the highest order of unreason. How successful the countries of Western Europe will be in keeping their left-wing groups under control, or, stated more precisely, how far toward the left the governments of Western Europe will go, depends upon two things more than all else put together: first, jobs for the millions of workers in these countries; and second, reasonably good nutrition for the lower-income masses. If there are to be jobs, the factories of these countries must be able to sell a fraction of their outputs abroad. If there is to be food enough of the right sorts, they must first of all have some dollars or other hard currency with which to buy it. But this will not be enough in many situations to provide adequate food for the lower-income masses.

Nor can we afford to let Latin America or the Far East drift further toward communism. We may not be able to trade much with the countries of these parts of the earth in terms of exchanging food for factory products, and there will be no need for this kind of trade in the case of many of these countries. But there may be need for other kinds of trade—in some cases, our factory products for their food, oils and fibers. Also in many such situations, other forms of assistance may be more important than trade.

Now comes the question for which all the foregoing is merely a

prologue: What can we in the United States and in other forward-looking countries do about the situation described? First, the United States, as *the United States*. Before we begin urging upon our countrymen any further opening of our markets to more imports, however, we need to consider the progress already made in this direction. In 1929, this country passed the Hawley-Smoot Tariff Act, which represented the all-time high for this country, and almost for the world, in attempts to isolate a country from world markets. Moreover, this action was extremely ill-timed, for it set a pattern for such action just at the outset of the Worldwide Depression of the 1930's, in the progress of which the farmers of Europe were generally able to induce their governments to raise import duties, as a farm-relief measure actually, although ostensibly for other reasons usually. The two cents per pound sugar duty of the Hawley-Smoot Act got translated into duties ranging from three to 15 cents per pound in the different countries of Europe. Some of the European countries raised their wheat duties to more than a dollar per bushel.

In contrast with 1929-33, the United States is today one of the low-tariff countries of the world. It has made this transition by a combination of processes, or of reasons, as follows:

1. The United States made no further tariff increases after 1929—the Democrats controlled Congress—and other countries kept on raising their customs duties.
2. At an opportune time, Congress was induced to provide for Reciprocal Trade Agreements.<sup>1</sup> Under these, the duties have been lowered on imports of a significant list of products.
3. The general rise in the price level has reduced the effect of all the specific tariff duties, that is, duties in cents per pound and the like.

I shall explain at this time that not only was the Reciprocal Trade Agreements program splendidly conceived, but that it has been very well administered. The State Department and other agencies of government concerned moved forward with it surefootedly but cautiously, watching carefully the effects on domestic trade and the reactions of the public. As a result, few of the attempts to restrict the program have prevailed in Congress.

But equally important is it that an increasing number of our

<sup>1</sup> See this *Journal*, May 1950, Lawrence Witt, "Our Agricultural and Trade Policies."

business and other leaders have gradually come to understand the full meaning of the fact that the United States now really is a creditor nation, and that it must import if it is going to export. When any one group of producers in this country rises up today and demands that competing imports be excluded, it is likely to be met with the more-or-less concerted opposition of all those who want to export, or who sense the broader need for more trade with Europe and the rest of the world. No doubt the Republican party in the coming campaign will follow its old pattern of promising higher tariff duties for everybody, thus hoping to draw the votes of all producer groups fearing foreign competition. But it is doubtful if any future Congress will fall back into the old pattern once so well stated by simple old Senator McCumber of the Fordney-McCumber Tariff Act of 1922: "At least a little bit of tariff protection is good for anybody."

It will not be enough, however, in the next five or ten years especially, merely to hold the important ground we have gained. The situation in the world and that in Europe particularly, if they are to be saved from demoralization, requires that the United States accept more imports, especially of industrial goods. What is called for at this stage is a very thorough job of analysis to determine what exports to the United States will help Europe most and how these will affect our economy as a whole and particular industries; then choose those that will be best for both Europe and the United States; and finally, along with the foregoing, work out a domestic program for adjusting our own industries to the proposed changes in imports. The Congress of the United States should set up a special ad hoc commission for this purpose made up of members of Congress, staff members from several agencies of governments, and others chosen from outside government. A bill for this purpose (S. 3288) was introduced into the Senate by Senator Clinton Anderson and also into the House, and the President has already set up a unit under Gordon Gray to work in this general field. The emphasis in the President's assignment to Gray is upon developing an international economic program to succeed the Marshall Plan and take in a wider horizon.

The other action that the United States needs to take is to help some of these countries make food available to malnourished groups in their population through supplementary food distribution measures. This was proposed by the United States members of the

Preparatory Commission on the World Food Board, and included in the recommendations of that Commission. But the Council of FAO, which has been assigned responsibility for such action, has itself made little or no progress in this direction, and is not likely to do so unless the United States steps out and provides specifically for making foods available for such use at special prices. If the United States leads off in this direction, some other countries may follow.

The important question arises, however, as to whether, once such provision is made, the United States should arrange for such distribution itself directly or let the Council of FAO do it. It is of the highest importance that such distribution be kept under rigorous control. To provide food generally for the underfed populations of over-populated countries like India would be the highest order of futility. Any amounts of food from the United States thus made available that moved into consumption through the usual channels of trade would have no other significant effect than to cause a slightly larger Indian population. At the best, it might do nothing more than raise the average expectation of life at birth in India from around 27.1 to 27.3. If India were, however, to set up the right kind of school-feeding and other supplementary programs, it might be worth while for the United States to provide certain essential foods for these at special prices.

The vital question is whether any international committee is likely to be in position to say whether or not a particular school-feeding program, for example, meets the required standards. The FAO, for entirely obvious reasons, is peculiarly disqualified to handle any problem involving questions of birth-rates and population. The whole history of FAO is one of keeping aloof from any proposals dealing with the vital population aspects of the food problem. The main reason for this is, of course, the tie-up of population with religion. The Hot Springs report blithely states that the nations of the earth can produce all the food the people need for good nutrition. All of us know that this is possible only if birthrates are much reduced in most of the densely populated areas—in Latin America as well as Asia, in the East Indies, and in important sections of Europe. And Director General Norris Dodd still goes gaily about the world telling about the 55,000 new mouths that must be fed for breakfast each morning!

Under these circumstances it may well be good wisdom for the

United States to develop its own procedures for making food available to the low-income masses of other countries, following the precedent established by the Marshall Plan and ECA. This would commonly mean collaboration with groups of countries, and with FAO only so far as FAO is free to do so.

There is growing support in this country for programs to make foods available to undernourished groups in other countries at special prices. The Dairy Federation resolved in favor of two-price programs at its recent annual meeting. What are in effect two-price programs have been strongly advocated in this country since 1922. Now it is necessary to tie these to programs in the receiving countries for getting the foods used by those who really need them. There is a large difference between advocating a simple two-price system and making foods available to low-income groups, but the two can easily be merged. When thus fitted together, the program resulting is reasonably protected against use as a dumping device.

The third thing that the United States can do is of course to take a vigorous part in the ITO and other international programs to expand international trade.

The Point Four Program, for which Congress has just made an initial grant, is not designed to promote trade directly. But properly conducted, it can do much to relieve pressures and strains in countries now threatened with the breakdown of free government, and thus keep them within the orbit of international trade. So far as food is concerned, helping for example India and Turkey to produce the foods they need for more adequate diets is a better procedure than our trying to produce it and then attempting to trade it off to them.

In connection with the Point Four and similar programs, it needs to be recognized that the people of the United States are severely handicapped when they set out to try to help the old countries of Europe and Asia to preserve their free governments. Their disposition is to impose on these older civilizations the particular kind of democracy that we have developed in this country. We fail to realize that our system grew under very special circumstances—an industrial revolution developing in a brand new continent with vast natural resources to exploit. Successful democracy in much of Europe, and surely in other parts of the world, is certain to take forms differing importantly from the democracy of the United States. But how hard it is for those of us who are called abroad as



helpers to realize these differences! The Point Four Program is commonly presented to us as a program of pure technological aid. As such, it will be largely useless in many parts of the world. For example, technology without important changes in land tenure will not go far in much of India, Pakistan, The Middle East, and large sections of Latin America. Moreover, these changes in land tenure have far more meaning for democracy and ultimate propulation adjustment than any possible improvements in the arts of production.

Latin America is a new continent like our own. But strangely enough, much of it has more in common with the Old World than with the New in the respects just named. This is partly because the populations of these countries, dominantly of mixed races in many situations, multiplied rapidly before industrialization began; partly because the cultures brought to the New World from Spain and Portugal were much nearer to the Middle Ages than were those brought to what is now the United States; and partly because the types of agriculture lend themselves to the plantation system.

Other nations than ours, however, have a part to play in a program of restoring international trade in foodstuffs. Breaking through the East-West barrier in Europe is most vital of all. Along with this, and especially if these obstructions are not removed, some kind of an alliance for freer trade among the countries of Western Europe is vital. J. K. Galbraith's article in last fall's *Harper's Magazine*, "Europe's Last Chance" was only mild exaggeration. Director Paul Hoffman of ECA is right in insisting upon a unified trade program for these countries. For each of these little countries to try to evolve a good diet for its people out of foods that can somehow be produced in that country is a great waste of resources. All will be fed better and more cheaply if each food or feedstuff is produced where conditions are best for it and the supplies above domestic needs are exchanged; and along with this, if food and industrial and mineral products are exchanged for each other.

The international programs in which the United States and other nations can join are of several types:

1. Simplest of all in appearance, but far from simple in operation, are the *international commodity agreements* of the type that came forward in the 1930's—those for wheat, sugar, coffee, tea and beef. The war virtually ended all of these except the one for wheat.



The Hot Springs Conference on Food and Agriculture in May 1943 gave highly qualified approval to such agreements, recognizing the danger that they might become only modified forms of international cartels like those for tin and rubber. It also substituted the term "arrangements" for "agreements," intending by this to provide for a wide range of provisions for interchange of products, including especially some to handle temporary situations. This was extremely wise. It does not seem likely that formal international commodity agreements will contribute in a large way to promoting international trade. They introduce too many complications and become cartels essentially unless they bring in the importing nations. If they do, the importing nations want relatively low prices whereas the exporting nations want relatively high ones. This is the main reason the exporting nations wish such agreements. Compromise pricing arrangements can be devised—they have been in a few cases—but they are extremely difficult.

Much more promise lies in less formal and shorter-term deals among a few countries at a time. These may take the form of nothing more than barter agreements. They need, however, to be more than the present term contracts between two nations. The Council of FAO has been in position to help small groups of countries get together along these lines, but thus far has failed to do so. The commodity arrangement of this type that has been cited as an example on several occasions is one for getting the supplies of skimmilk powder, or large potential supplies of it in New Zealand and Australia as well as in the United States, added to the diets of the people of the Far East which are so low in animal proteins and calcium.

The proposal strongly urged by the British at the Hot Springs Conference was for *international buffer stocks*—that is, for an international "ever-normal granary." These have real possibilities for groups of countries, such as the Atlantic Charter group. In the world of today, they cannot be separated from military preparedness and military alliances. One must recognize that carrying larger stocks of any commodity than the normal demands of current trade and consumption entails additional carrying charges, and some means must be devised for sharing these costs.

The *international commodity clearing house* proposal worked up by a committee of "experts" appointed by FAO last summer met with the fate that could have been expected. Its financing plan

called for accepting soft-currency payments at full face value and absorbing the losses incurred thereby internationally, which meant by the United States in a large way. Our State Department could not see a way of fitting such a proposal into existing international monetary arrangements. Without United States support, the FAO Conference rejected it.

One can understand how the committee of experts that drafted this proposal, faced with the impending need for handling large surpluses, came to the conclusion that financing on some such drastic basis was imperative. Nevertheless, more important over the next five years is setting up facilities in FAO for getting small groups of nations together to work out international deals for handling particular situations as they arise. This called for some form of staff agency attached to FAO with personnel qualified to negotiate such deals—with some such relation to FAO as formerly between FAO and IEFC. The FAO, however, strongly opposed such a provision.

The proposal to this effect really originated in a meeting of the International Technical Coordinating Committee of FAO, at its first and only meeting held in Washington in May 1949.<sup>2</sup> The exact language of the action taken by this Committee was as follows:

“Involved in any consideration of the program of work for the Distribution Division of FAO is the whole problem of the impending reappearance of the same paradox of large surpluses of food and cotton in parts of the world with great need for these in other parts, that led to the setting up of the Mixed Commission of the League of Nations and the proposal for the ‘marriage of health and agriculture’ in the 1930’s. FAO largely grew out of that situation and the work of that Mixed Commission. It must above all else be prepared to deal with such a situation when it arises again.

“Fortunately the procedures for dealing with such a situation were outlined in the report of the Preparatory Commission on the World Food Board Proposal, and accepted at the Geneva Conference following, and the Council of FAO (World Food Board) was organized at that time to carry out these procedures.

“However, the Council of FAO has not yet equipped itself to perform this function. What it needs is a strong staff of international consultants to confer with and bring together the particular group of nations which needs to take action whenever a surplus-deficit situation arises, and arrange the necessary program of action and organization for the dealing

<sup>2</sup> This consists of the Chairmen of the seven International Advisory Committees of FAO, and is provided for in the charter of FAO.

with this situation. This staff would be the operating arm of the Council of FAO in this sphere of its responsibilities.

"The arrangements worked out in this way for dealing with such situations are properly called 'international commodity arrangements', if commodity is understood in the plural, as will be explained later. In general they will be ad hoc in character. But some of the situations needing to be dealt with in this way may prove to be so persistent that formal 'international commodity agreements' may gradually evolve.

"Three important points with respect to such arrangements need always be kept in the forefront. The first is that the FAO cannot afford to sit back and let these situations develop and then try to deal with them on an emergency basis. Instead, it should look forward to them and forestall them. Whenever possible, plans should be made in advance so that the nations threatened with a surplus of some product might shift some of the production of it to some other product or group of products which the deficit nations can use to advantage in improving their diets.

"Second, it follows from the foregoing that this problem can be dealt with only to a limited extent on a single-commodity basis. The IEFEC was of course concerned only with allocating limited supplies of commodities already produced, and needed to work on a single-commodity basis. FAO has the much larger problem of adjusting production and consumption to each other so as to keep production in good balance, and this is rarely a problem for one commodity considered at a time. To illustrate, the cotton surplus problem is much larger than finding outlets for cotton or reducing its acreage. A major factor in its solution is finding outlets for the foods that need to be produced in place of cotton.

"Equally important, if the countries receiving these foods are going to be able to pay for them, they will need to be able in most cases to find outlets for products which they can produce for export. The negotiating of international commodity arrangements will therefore call for broad analysis of international exchange.

"Third, perhaps, in order to prevent misunderstanding, it needs also to be stated that any activities of the Council of FAO along the lines here defined must be integrated fully with the programs and procedures of ITO when it is set up, and also work with any international commodity organization that may now exist, or may come into existence.

"It follows from the foregoing that the Council of FAO and its staff of international consultants and arrangers working on this problem will need to be serviced by a staff of broad-gauged economists who might to advantage be attached to the Division of Economics and Statistics, and work in an integrated way in that Division. The economists doing this servicing need to include production economists, consumption economists and marketing economists. It goes without saying that the pure theoretical type of economist will be of no use in such analysis. Applied economists are needed who know their geography, their land use, their commodities, their people and their dietaries.

"A final consideration is that playing a strong role in dealing with this

problem will do more to assure FAO of much needed additional financial support than almost anything that can be named.

"The Technical Coordinating Committee, after consideration of the foregoing statement, approves it, and asks the Council of FAO to consider it at its next meeting."

At the time this action was taken by the International Technical Coordinating Committee of FAO, the proposal as to organization and facilities was objected to by Director Dodd and his immediate staff as going beyond the responsibility of the Committee. Nevertheless, this was the heart of the suggestion. And this part of the proposal was in effect sidestepped by the committee of experts, with the result that the only facility now available is the apparently helpless Council of FAO, which is trying to deal with the situation through a Committee on Commodity Problems.<sup>3</sup>

FAO is doing many highly useful things for world agriculture. Its program of activities reaches far beyond that of its predecessor, the International Institute of Agriculture of Rome, Italy, to the site of which it is scheduled to return in 1951. Most of what it is doing is worth to the people of the world much more than is being spent upon it. But as an instrument for facilitating international trade in foodstuffs, it has done very little indeed since IEFC was terminated, and is likely to do little more unless some important revisions in its mode of functioning are made.

This paper began with a statement as to the extent of international trade in the foodstuffs of the United States, assuming freedom of import and export. It needs to be concluded with the statement that a better distribution of the population of the earth among nations would have the general effect of reducing the proportion of foodstuffs consumed of foreign origin. The general effect of the industrialization movement so vigorously being promoted today is to provide a market at home for the foods produced in each country. The factories and workshops of the future in turn will largely find their markets among the peoples of the same country.

<sup>3</sup> The statement on this point in the report of the last meeting of the Council of FAO (May 1950) is as follows: "The Council notes that the Committee has hardly had time since the last Conference to do more than initiate its activities. It also notes that no country has indicated so far that it has any serious problem of commodity surpluses or of food deficiency requiring special and urgent action. Since, however, the situation needs to be kept under constant review, the Council recommends that the work of the Committee be actively pursued. It looks upon the Committee as its instrument to carry out FAO's responsibilities to analyze and interpret the international commodity situation and advise on suitable action whenever appropriate."

A serious consequence of this is that some of the countries of Europe that developed large populations on the basis of exchanging factory products for food are finding themselves over-industrialized, and may find it necessary to export population rather than factory products if they are to maintain current levels of living.

But after all these developments have taken place, some countries will still have more industry than agriculture because of resources of coal, iron and other minerals, and others will have more agriculture than industry for the opposite reasons. And these differences will provide one basis for a sizable volume of trade in foodstuffs. The other basis will be the exchange of different foodstuffs and feedstuffs that are needed to provide balanced and diversified diets for all peoples.

## THE MILKERS' UNIONS OF THE SAN FRANCISCO AND LOS ANGELES MILKSHEDS

An inquiry into modern industrialized dairying and  
collective bargaining in agriculture

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### I. Introduction

**M**ILKERS on dairy farms in the San Francisco and the Los Angeles milksheds are organized in two unions: A.F.L. Local 304 (San Jose) and Local 737 (Los Angeles). These unions and the consumption of "union-made milk" in the two cities reflect the industrialization of the San Francisco and Los Angeles dairy farms.

For typical milk producing regions in the United States "... dairying is characteristically a family enterprise. This is because of the regularity with which the work has to be done and because of the personal attention required in the handling of the herd in order to get the best return."<sup>1</sup> But some of the very features which make dairying well-suited for the family-type operation permit, and indeed favor, as in California, a highly rationalized form of enterprise. There the personal attention of the operator is directed mainly towards managerial activities in order to obtain "best returns," and the handling of the herd is left to industrialized milkers and foremen who possess skill and experience in the care of the stock.

Why are the Milksters' Unions noteworthy?

In the past, union activities in agriculture—usually sporadic and of short duration—have been concerned with seasonal and migratory workers or with "allied" industries. However, collective bargaining in California dairies has existed for nearly 17 years; dairying offers steady employment, even though milk production is subject to seasonal fluctuations; problems involved in migratory or seasonal labor do not arise in the unionization of dairy-workers.

\* This paper is based, in part, on interviews with representatives of the employer groups and the unions. I am greatly indebted to Prof. Paul S. Taylor and Warden Fuller, U.C., Berkeley, Calif.; Mr. Jeff. Cohelan, Secy. A.F.L. #302, Oakland, Calif.; Mr. Th. E. Case, Secy. A.F.L. #737, L.A., Calif.; Mr. J. Silva, Secy. A.F.L. #304, San Jose, Calif., Mr. O. Nervik and Mrs. M. Smythe, S.D. State College.

<sup>1</sup> A. F. Raper, in: *Rural Life in the U. S.* by C. C. Taylor and others, New York, 1940, p. 418.



Milk production during 1947 held top place among farm commodities in terms of total farm income. The unionization of milkers has therefore taken place in a leading agricultural industry.

The San Francisco and bay areas and the heavily populated Los Angeles County are the largest milk markets on the West Coast and among the largest of the United States in terms of population.

For agricultural laborers the recognition of the Milklers' Unions as a bargaining agent is doubly significant because of the traditional antagonism of agricultural employers to organized labor. A wedge has thus been driven by organized labor into California agriculture.

## II. *The San Francisco and Los Angeles Milksheds*

The problems arising from the existence of the unions and their relations with the dairy operators are best understood with reference to the type of dairy farming prevailing in the two milksheds.

### *General Characteristics*

1. The counties surrounding San Francisco are an old and well developed dairy region where dairymen use methods not unlike those in other traditional milk-producing sections of the United States. Though some hay and feed are grown by farmers, large quantities of alfalfa hay have to be transported by truck from the interior of the state in order to satisfy fully the feed requirements. The boundaries of the milkshed are narrow (about 50 miles from the bay cities) and the dairies which produce Grade A milk and cream for city consumption are located within very short hauling distance.<sup>2</sup> Practically all the milk and cream consumed are delivered by trucks, whereas other large cities depend both on railroads and trucks for their milk shipments.

2. Los Angeles County and city obtain their greatest share of fluid market milk and cream from the so-called dry-lot dairies, the majority of which lie within 25 miles from "down-town," within Los Angeles County itself or counties immediately bordering it. The development of this extremely concentrated milkshed is the result "of a rather unique combination of economic, climatic and topographical conditions."<sup>3</sup> As Los Angeles is separated from the

<sup>2</sup> *Production and Consumption Balance for California Milk Markets*, Univ. of Calif., Agric. Exp. Station, Berkeley, Calif. March 1949. (Mimeo.)

<sup>3</sup> *Economic Factors Affecting the Production of Fluid Milk in the Los Angeles County Marketing Area*, by G. M. Beal, State Dept. of Agric., Sacramento, 1944, p. 5.

fertile, irrigated and hot valleys of the interior by a chain of arid mountains, the shipment of milk produced for city consumption encountered difficulties which caused dairymen to move into the immediate vicinity of the city. With the recent population increase, the milkshed has slowly extended its boundaries so that some Grade A milk, and especially Grade A cream, are now shipped longer distances in refrigerated trucks. The Bureau of Milk Control reports that in 1948, 10 percent of milk received in the Los Angeles marketing area is "Valley" Grade A milk, whereas 90 percent of the milk is "Local" Grade A milk, produced in the Paramount (Hynes)-Norwalk-Artesia region and other dairies in the vicinity of the city.

3. This type of farming is an outstanding example of *regional specialization of production* in agriculture. Though there is considerable variety in the operation of the dairies, and though a few farms have pasture and grow some feed, nearly all the hay and large quantities of green feed are shipped in from farms specializing in the production of hay in the valley or in Los Angeles County itself. Some of the counties surrounding Los Angeles County and the bay area rank very high among the leading hay and alfalfa producing counties of the United States.<sup>4</sup>

Regional specialization and the necessity of trucking feed into the dairies favor large-scale operation and vertical integration of enterprises, because the costs of production of fluid milk may be reduced materially if additional hay or pasture land is owned or operated outside of the milkshed proper. This places large-scale operators in a favorable position compared to that of dairymen who purchase all their roughage instead of growing and trucking their own. But whether the dairyman produces or purchases his feed, he depends on trucks not only for the sale of his product but also for the raw material which goes into the production of milk. In accordance with the general principles of transportation economics, the dairies in Los Angeles and in San Francisco have presumably located at a point where the combined transportation costs on relatively long hauls of bulky feeds and very short shipments of fluid milk are at a minimum.

4. In 1947 the quantity of milk produced per cow was greater in

<sup>4</sup> Cf. Agric. Census of 1945, Spec. Volume on Ranking Counties. Using acreage as criterion, the counties rank as follows: Imperial 1, Kern 8, L.A. 15, Riverside 37, Fresno 5, Merced 6, Stanislaus 9, San Joaquin 20.

the state of California than in any other state of the Union;<sup>5</sup> it is greatest in the two market-milk producing milksheds. The California Bureau of Milk Control found in 1948 that for 69 herds in the Los Angeles region the total production of milk per cow per year was 11,163 pounds; for 77 herds in the bay area, 9,000 pounds of milk. Both figures are considerably higher than the average for the state,<sup>6</sup> which was 7,190 pounds of milk and 280 pounds of milkfat per cow in 1948 (5,000 and 199 respectively in the United States).

5. In addition to showing high productivity per cow the counties surrounding Los Angeles (including Los Angeles County) and San Francisco are producers of large total quantities and values of fluid milk.<sup>7</sup> The Agricultural Censuses show a heavy concentration of production in the milksheds: Los Angeles County stood first, both in 1939 and 1944, among all U. S. counties for milk produced on farms in terms of quantity and value. Three counties near the bay area, Marin, Sonoma and Santa Clara, were among those leading in 1939 and 1944 for quantity or value of milk (or both). These large quantities of milk are produced on a relatively small number of farms.<sup>8</sup>

6. *Trend towards large scale operation.* Large scale dairies are important in California.<sup>9</sup> Some caution should, however, be exercised when interpreting data on scale of operation in the California dairy industry. The lines are difficult to draw between large-scale and smaller enterprises, as shown by a report of the Bureau of Agricultural Economics<sup>10</sup> which stated:

"On the basis of available data, it has been determined that the 90-cow herd will require one machine milker, a combination general dairy hand and hand-milker or stripper, a relief machine milker for four days per month and full time attention of the operator for management and general

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<sup>5</sup> *Farm Production, Disposition and Income from Milk, 1947-48*, BAE, Wash., April, 1949, Table 5.

<sup>6</sup> Similar evidence can be found in the 1948 *Report of the Los Angeles County Farm Bureau Cow Testing Association*.—According to *The Dairy Situation*, BAE, Jan., 1949, p. 13 ff. the productivity of cows in California rises as the size of the herd increases. It is shown below that the number of large-scale dairies is greatest in the counties bordering the two metropolitan areas. (Table II below.)

<sup>7</sup> Some counties in the valley are leading Grade B milk producing counties. Stanislaus Co. was the sixth U. S. county in quantity of milk produced. Most of the milk is produced on small-scale dairies. (Table II below.)

<sup>8</sup> Cf. *Calif. Dairy Industry Statistics for 1947*, Calif. Crop and Livestock Reporting Service; Spec. Publ. No. 230. Tables 10 and 15.

<sup>9</sup> Census of 1930, *Monograph on Large Scale Farming in the U. S.*, 1929.

<sup>10</sup> *Labor and Other Factors Influencing Dairy Production in the L. A. Milkshed*, Feb., 1943, p. 37.

work around the dairy in connection with feeding, milking and general dairy operations."

Does this describe a family type farm operation or a small plant?

Is the trend in the dairy industry toward fewer but larger dairies, as has been maintained? At present, the trend can only be tested for Los Angeles on the basis of data published by the L. A. County Livestock Department.<sup>11</sup>

From Table I it will be observed that, over a period of 15 years, the distribution of cows within the various size groups has been significantly altered in favor of medium and large herds: these groups now form 59 percent of all farms and own 88 percent of all

TABLE I. NUMBER OF HERDS AND DAIRY COWS BY SIZE OF HERD, 1933-34, 1938-39 AND 1947-48, LOS ANGELES COUNTY (HERDS WITH FIVE COWS AND OVER)

Size of herd	1933-34			1938-39			1947-48		
	No. of herds	No. of cows	Average size	No. of herds	No. of cows	Average size	No. of herds	No. of cows	Average size
<i>Small herds:</i>									
5-60 cows	742	22,703	31	733	18,459	25	508	12,525	25
<i>Medium herds:</i>									
61-500 cows	281	32,849	117	401	56,963	124	723	98,987	137
<i>Large herds:</i>									
501-1,000 cows	6	4,007	683	13	9,056	697	20	13,205	660
<i>Very large herds:</i>									
1,001-2,000 cows	2	2,356	1,178	3	3,725	1,242	2	2,802	1,401
<i>Large &amp; very large herds:</i>									
501-2,000 cows	8	6,453	807	16	12,781	799	22	16,007	728
Total	1,031	62,005	60	1,210	88,203	73	1,253	127,519	102

Source: Annual Reports of the Los Angeles County Livestock Department.

cows in Los Angeles County, in comparison to 1933-34 when they formed 28 percent of all farms and owned 60 percent of all cows. There has therefore been a considerable shift toward a larger scale of operation.

7. Large scale dairying is concentrated in the Grade A milksheds, i.e. in the counties surrounding San Francisco and Los Angeles. Table II shows that farms with herds of 100 cows and over are relatively more numerous, own a greater percentage of cows and sell a much larger share of total milk in the milksheds than in valley counties in which dairying is predominant. The circumstance explains why the milkers' unions have been, heretofore, successful in the Grade A milksheds only (see below).

8. The peculiar conditions in the Los Angeles milkshed are often

<sup>11</sup> However, published statistics underestimate the relative importance of large scale dairy operations in two ways: they do not account for multiple ownership nor do they give information on agricultural holdings outside of the milkshed proper and the ownership of replacement stock.

referred to as "artificial" and "wasteful." The term "artificial" is probably meant to imply that the dry-lot barn dairies are a passing phenomenon which is due to disappear in the near future to be replaced by a more "natural" kind of small-scale family type dairy farms in the valley. The word "wasteful" refers to the elimination of the young stock on dairies and the tremendous need for replacement.<sup>12</sup> Several data confirm the opinion that the dry-lot dairies have no tendency to disappear, but are on the contrary well-established; and that "waste" is a relative concept which has to be interpreted in the light of the accomplishments also achieved by the methods causing the "waste."

TABLE II. COWS MILKED AND WHOLE MILK SOLD ON FARMS WITH 100 COWS AND OVER, AS PERCENT OF ALL COWS MILKED AND WHOLE MILK SOLD ON FARMS REPORTING, BY AREAS, 1939

Area	Cows milked		Whole milk sold (excl. butter and cream)	
	Farms reporting	No. of cows	Farms reporting	Milk sold
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
San Francisco area <sup>a</sup>	18.1	45.0	25.8	53.7
Valley <sup>b</sup>	2.3	15.1	2.4	17.1
Los Angeles area <sup>c</sup>	24.2	60.8	26.0	60.7
California	4.2	25.0	5.5	32.8

<sup>a</sup> Marin, Contra Costa, Alameda, Santa Clara, Sonoma.

<sup>b</sup> San Joaquin, Stanislaus.

<sup>c</sup> Los Angeles, Orange.

Source: 1940 Census of Agriculture, *Spec. Report on Cows Milked and Dairy Products*.

### *The Economics of the Dairy Enterprise*

Dairies in the two milksheds show in a significant manner that the production of agricultural commodities—like milk—can be accomplished, on the farm level, by enterprises the structure and operation of which closely resemble an industry producing non-agricultural goods.

<sup>13</sup> The need for replacement is shown in the following data:

<i>Year</i>	<i>No. cows in county</i>	<i>Cows shipped into county</i>
1933-34	63,774	19,708
1940-41	102,460	40,058
1947-48	132,429	59,734

The average life of a cow in L. A. is therefore only two to two and one-half years. As for the killing of calves, if the scale of enterprise is large enough to include additional land (owned or rented) outside of the milkshed proper, producers find it profitable to raise their own stock for replacement. High priced land in the metropolitan area cannot be used for raising calves.

1. *Specialization in dairying* is one of the outstanding characteristics of California dairy farms. The farm enterprise is geared entirely or almost so to the production and the sale of milk. Rarely do dairy farmers engage in other agricultural activities.

2. The dairies carry a *high investment* in land and buildings, equipment and cattle. The average dairy investment (excluding that in land in pasture, living quarters, etc.) on 69 farms in the Los Angeles area with an average of 213 cows per herd was estimated by the California Bureau of Milk Control at \$100,000 in 1948; in the bay area at \$50,000 for 77 farms with an average of 118 cows per herd. Investment does not represent actual market value, but worth when purchased. At least half of this amount represents the stock.

3. *Mechanization*, an indication of rapid industrialization, is shown by the disappearance of hand-milking in both milksheds and, within the last few years, the introduction of refrigerated milkvats replacing the traditional milkcans and making possible a more efficient handling of the raw milk. The shortage of milkers during and after the war has speeded the introduction of labor-saving milking machines on farms that hitherto had adhered to hand-milking.<sup>13</sup> In the bay area this movement has probably been more pronounced than in Los Angeles, where many heavy producers are still milked by hand. It is believed that mechanization has resulted in a permanent and absolute displacement of dairy labor in the bay area, hence paradoxically a relative decrease of men per farm in Los Angeles has followed in the wake of an increase in dairies and in the number of cows in the county.<sup>14</sup>

4. *Development of the skilled, industrialized dairy-worker.* Work on dairy-farms, particularly milking, has now become a fairly skilled occupation. A survey made during the war by the Bureau of Agricultural Economics<sup>15</sup> stated that "dairy farmers are exceedingly reluctant to hire the totally inexperienced. Most dairy workers who lack training in the highly commercialized methods of dairying are considered to be nearly inexperienced." Milkers claiming experience in milking elsewhere need a training of several months to become adapted to modern dairy operations. Skill involves mainly speed

<sup>13</sup> *Labor and Other Factors Influencing Dairy Production in the L. A. Milkshed*, p. 11 ff.

<sup>14</sup> The number of cows in L. A. County has increased from 113,000 in 1944-45 to 132,000 in 1947-48, i.e. by 17 percent.

<sup>15</sup> *Labor and other factors . . . op. cit.*, p. 15.



and knowledge of good milking and feeding practices. Milkers must try to maintain high production of each individual cow as an industrial worker has to watch his tools or machines. High skill is also involved in the work of the relief-milker (see below).

5. *Division of labor.* Whereas the traditional "hired man" and his employer have to engage in a multitude of activities, the modern dairy workers fall into several categories according to their main duties. Various types of occupations are enumerated in the Los Angeles union agreement: regular milkers (hand-, machine milkers), relief milkers, working foremen, hospital barn men, feeders, including calf feeders, green hay haulers, milkhouse employees, maintenance men and transport drivers. In the bay area, where a similar classification of dairy workers exists in practice, but where the union has jurisdiction over milkers only, the division of labor is evidenced in the provision that for a milker "no other work of an outside nature shall be allowed except where he milks 20 cows or less" and except that he may do some milkhouse work, for which he receives additional remuneration.<sup>16</sup>

6. *Wage aspects.* Industrial dairy workers receive their remuneration more and more exclusively in cash-wages. Los Angeles took the lead in abolishing the various forms of perquisites; even the traditional "quart of milk" seems to have disappeared. However, in the bay area the payment of wages in terms of perquisites has not yet completely vanished.

Wages of dairy workers are high. Do high wages result in excessive labor costs in the production of milk? According to the California Bureau of Milk Control these were 13 percent of the total production costs in 1948. This information was obtained from data taken on 69 Los Angeles dairies with 253 employees. Average wages were \$351 per month for milkers and \$280 for laborers. In the bay area 77 producers spent 15 percent of total production costs on milkers and laborers whose average monthly salaries were \$304 and \$235 respectively. These data are not strictly representative, but should indicate that high wages do not necessarily mean high labor costs on farms any more than in industry.<sup>17</sup>

<sup>16</sup> The L. A. contract provides in a separate clause for the payment of so-called "combination employees."

<sup>17</sup> Hired labor costs were 14.2 percent on market milk dairies in the San Joaquin Valley (small scale dairying), on an 11-year average, 1928-38. Cf. *Dairy Management in California*, Univ. of Calif., Exp. Station Bull. 640, 1940, Table 3. Cf. also A. Ross, *Trade Union Wage Policy*, Univ. of Calif., pp. 80 ff., 86, as to high wages and labor costs.

### III. *Collective Bargaining in the Dairies* *Organization and Strength of the Unions*

1. Collective bargaining between milk producers and the milkers' unions exists now mainly in the large-scale dairies, and in some with a small number of workers. Prior to about 1935 wages and working conditions on dairy farms were poor. Milkers and other dairy workers received low wages, worked long hours, were poorly housed, received no days off and were generally hired through fee-charging private employment agencies who sometimes shared the proceeds of their commissions with the dairy foremen and were interested in a high labor turn-over. In addition, a milker was required to perform various other farm duties besides the milking itself.<sup>18</sup> In the words of the union representative, "The only way a milker could get a day off was by quitting his job."

2. Dairy workers, as agricultural workers, did not benefit directly from the provisions of the N.L.R.A. Under the protection of the A.F.L. Brotherhood of Teamsters, particularly the Dairy Plant Employees and Truck Drivers of Oakland and San Francisco, and the use of the secondary boycott, the "Dairy and Creamery Employees Local Union No. 304" of San Jose, California, was organized in 1933.<sup>19</sup> Since trucking is an important element in the marketing of fluid milk and in supplying the dairies with feed, the Teamsters could exercise strong pressure on farmers to recognize the unions. In certain instances dairy plant owners urged operators to sign up with the union because they were unwilling to face strikes and boycotts. The dairymen themselves were not always opposed to the union which promised them assistance in obtaining higher prices for milk.

The Los Angeles "Hay Haulers, Dairy Employees and Helpers, Local Union No. 737" grew partly out of a jurisdictional dispute with the C.I.O. Its success was due to some extent to the unwillingness of the employers to deal with two unions instead of one—a condition which arose mainly with respect to those dairy-operators who were both producers and processors or distributors of milk.

<sup>18</sup> One witness at the LaFollette Hearings, part 58, p. 21456, stated: "... it was generally the idea amongst dairymen if the employee got a day off, they—it would tend to ruin the cows and not—and lessen production . . . a man would work until he was dead on his feet and then he would have to quit and go to town again." Cf. also Jamieson, *Labor Unionism in American Agriculture*, 1944, p. 166.

<sup>19</sup> Its early history is fully described in a letter from its Secretary to the LaFollette Committee: Hearings, part 68, Exh. 11661 B, p. 25223. Cf. also Report VIII, pp. 1445 ff. on the milk disputes in the San Francisco area.

But it was also attributable, as in San Francisco, to the strategic position of the A.F.L. Teamsters in plants and on the highways.<sup>20</sup>

3. There is a sharp contrast in the organization of the unions. Local No. 304 is organized like a *craft union*: its jurisdiction is over milkers only and extends over seven counties in the bay area milkshed. It has agreements with dairy farmers in most of these counties and is particularly strong in the main Grade A milk-producing ones, Marin and Santa Clara. Local No. 737, with jurisdiction over three counties (Los Angeles, Ventura and Orange) is organized according to the set-up of an *industrial union*: it covers not only milkers, but also working foremen, hospital barn men, feeders and green hay haulers, milkhouse employees and others. It cuts therefore more deeply into the farm operation than the San Francisco Local, since it has organized all labor involved in the production of milk on dairies. Both unions are affiliated with the International Brotherhood of Teamsters, Chauffeurs, Warehousemen and Helpers of America.

4. At the present time, the Los Angeles Local seems to be more important, both in membership and in actual strength. It numbers about 1,000 men, though precise data cannot be obtained. It has at present 150 agreements with large and small dairies. The San Francisco Union was, according to the *Officers' Reports and Proceedings of the 45th Annual Convention of the California State Federation of Labor in 1948*, entitled to 416 votes representing 416 members. It claims to have 250 signed agreements with dairies. As a result of the displacement of milkers by milking machines, the latter union admits the loss of about 300 men since the beginning of World War II. But the number of members does not, in itself, reflect the actual strength of a union. Between 1939 and 1940 no agreements were signed between the employers and Local 304. Negotiations were interrupted because of the collective efforts of some employers to weaken the union by starting numerous court proceedings against it. Admittedly this affected the financial resources of the organization so that it had to forego collective bargaining during that time.<sup>21</sup>

<sup>20</sup> Prior to 1936 the milkers were organized by the Trade Union Unity League and later formed an independent Milk Workers Recreation Club, or Dairy Workers Union, which became Local 49 of the C.I.O. These earlier unions used more violent methods and seemed to have contributed to the initial hostility of the employers. Actually Local No. 737 grew out of A.F.L. Local No. 93, involving all dairy workers, including drivers, plant workers, and milkers. Local 93 now has jurisdiction over 4,000 dairy plant employees and clerical workers only.

<sup>21</sup> The court proceedings were decided in favor of the unions, as were also some cases following the war.

Since 1940 the agreements have always been renewed in San Francisco. In Los Angeles, there has been no major interruption in collective bargaining.

5. It is estimated that 50 percent of the milk consumed in both Los Angeles and San Francisco in the form of fluid milk and cream is "union-made" milk, i.e. comes from dairy farms having an agreement with the unions.<sup>22</sup>

The Los Angeles Union claims that all dairies with more than 10 employees in the milkshed have an agreement with the union. This claim is perhaps not literally true. The writer visited a dairy with at least 15 employees which had just refused to renew the agreement. On the other hand, a number of small dairies with less than 10 employees are organized, and many union-milkers work in unorganized dairies. There exists a state of flux in collective bargaining in the Los Angeles milkshed due, to some extent, to the ever-varying number of dairies in the area and changes in operatorship. The position of the unions is not secure so long as dairies sign or reject the agreement individually, while others remain unorganized, and non-union workers constitute a potential competitive supply of cheaper labor.

#### *Relationship Between Employers and Unions.*

1. The early violent antagonism between employers and unions, by and large, has been replaced by the recognition by most employers of unionized milkers that collective bargaining in dairies is here to stay.<sup>23</sup> This acknowledgement is significant for agricultural workers as a whole. The unions have adopted a business-like, conciliatory and careful policy, in contrast to the aggressiveness which was necessary for the attainment of their objectives in the face of strong, organized and sometimes illegal opposition of certain employer groups. The unions now use persuasion in order to win new agreements, with one dairy at a time; persuasion promotes better long-run relations and avoids the bitterness which employers may feel if forced into a contract against their will. Where agreements exist, relations have not been disturbed by strikes and only rarely

<sup>22</sup> The Los Angeles Union representative estimates that 75 percent of all milk is produced in L. A. County on organized dairies, 100 percent in Ventura County. One representative of the bay area employers estimates that about 40 percent of all Grade A milk now comes from unionized farms in the bay area milkshed.

<sup>23</sup> Cf. Reynolds, *Labor Economics and Labor Relations*, 1949, p. 166: "... management eventually abandons hope of a return to non-union conditions. Only at this point can one say that the plant is really unionized."

by disagreements.<sup>24</sup> Some "disorder" occurred in 1946 in Los Angeles and Orange Counties when an organizational drive was started by Local No. 737.

Local 304 in the bay area is in a strong position at the present time, under Section XI of their agreement, in effect since 1943, which provides that the contract "shall remain in full force and effect . . . until six months after the Congress of the United States declares the war to be officially over, provided however that said contract may be reopened to be modified only as to wages and working conditions. . . ." This section has recently been upheld by the Courts and is still valid as of March 1950. In Los Angeles the relations between employers and the union were improved considerably when a short course undertaken by the City Health Department's Milk Division, for the purpose of emphasizing the importance of producing good milk, was strongly endorsed and attended by the milkers themselves. Such cooperation may diminish the dislike of agricultural employers for collective bargaining. And, on the part of the workers, it indicates a recognition of the relationship between efficient dairying and their cash wages.

2. The topic "Milkers' Unions" is generally treated gingerly both by employers and unions. This is partly the consequence of earlier hostility between the two groups, partly the result of political strategy. To propagandise unduly the existence of organized agricultural labor may be unfavorable to either group—to employers because they would have to admit that collective bargaining can be established on farms, to unions mainly because of certain legal disadvantages which ensue from existing labor legislation.

3. Under the Taft-Hartley Act, the milkers cannot easily resort to the secondary boycott formerly used extensively to win recognition. Though milkers as agricultural workers do not fall under the jurisdiction of the Act, the dairy plant workers and truck drivers who do, and whose assistance would be necessary to enforce a secondary boycott, would be reluctant to expose themselves under present conditions to expensive injunction proceedings. Therefore the unions have to use other, slower ways to win recognition, even though methods resembling the secondary boycott can be resorted to.<sup>25</sup> Under existing legislation, they will be hesitant to risk their

<sup>24</sup> According to information received by the Department of Labor Statistics, no strikes on dairy farms in California have been recorded since 1941.

<sup>25</sup> If the milkers picket a farm, the milk-truck driver will not pick up this farmer's milk because "a good union man will not cross a picket line." But will this keep his milk effectively out of a milk plant?

resources and possibly their very existence in order to win a few agreements. Only recently Local 304 failed to win agreements in Marin County and refrained from forcing the issue.

The absence of a competing union may also have an effect on the policy of the unions.

It may be interesting to note that the traditional opposition of farmers to labor may disappear when they are confronted with the actual problem of signing a contract with the union. The unions assert that farmers "would be quite cooperative without outside interference" of employers' associations pursuing an active anti-union policy. This statement will be put to a new test, since Local 304 is now trying to organize some of the dairies in the California valley where operators are dissatisfied with conditions in the Grade B milk market.

4. Since federal labor legislation does not cover agricultural workers, the process of organizing dairies is different from the unionization of industrial plants. In the latter, the union tries to induce the employees to join and then to hold an election to win exclusive bargaining rights. The Milkers' Union does not have to hold an election in order to win such rights, and cannot ask the N.L.R.B. for one. The usual method is to persuade an employer to sign the agreement and then, if necessary, to convince the dairy-workers to join the union. This method makes it doubly important to win the sympathy of the operator first. The unions claim that the exemption from the Taft-Hartley Act is an advantage—mainly because of the difficulties of organizing agricultural workers. Today, *fear of dismissal or ostracism because of trade-union activities is still typical among unorganized dairy workers in rural communities and therefore justifies the unions' claim.* Unfortunately little else is known about "how the milkers feel" about unionization. It is to be presumed that the growth of the milkers' unions has at least increased the awareness of many agricultural workers of the potentialities of collective bargaining. The task of winning new agreements is simplified by the fact that unions have already a strong toehold in the marketmilk regions and have satisfactorily bargained collectively for a period of 15 years; that they have the support of the Teamsters, and that they have obtained advantages for their members as well as for the dairymen themselves.

5. Earlier antagonism has not disappeared completely yet. Unorganized workers receive on the average lower wages or have poorer working conditions. This creates attitudes antagonistic to



the employers, sympathetic to the unions. It is often denied that wages are lower in non-union dairies. In the absence of conclusive statistics, statements about lower wages and poorer working conditions are based partly on observations. One representative of the dairy operators said to the writer: "it is very easy at present to get a milker for fifty dollars below union wages" (in the bay area). This indicates at least a propensity to pay wages below the union scale. Whether union workers invariably obtain union scale wages has been very difficult to determine.

Some employers resent deeply the existence of collective bargaining in agriculture and fear it as a wedge. When during the war the War Food Administration tried to impose a wage ceiling on milkers in the Los Angeles area, some operators resented "allowing the workers a voice in running their business and left the impression that a fairly wide gulf usually existed between operators and laborers in the industry."<sup>26</sup>

#### *Accomplishments of the Unions*

The accomplishments of the Milksters' Unions are obscured by the effects of the war on wages and working conditions. High wages and other improvements are partly, but not solely, the result of the fact that dairy workers could obtain "attractive defense jobs" in war factories and shipyards within eyesight of the farms.

1. *Union Security.* Both unions have established a union-shop on dairies which have an agreement with them; men hired by the employers must join the union within a specified time. In the bay area an employer is free, according to the agreement, to hire a milker without first calling on the union, though in practice most of them do not take advantage of this privilege. In Los Angeles preferential hiring exists according to Section "O" of the agreement under which the employer agrees to "first call the union for the purpose of obtaining help." In former years the union maintained a Hiring Hall. Now the union's office in Los Angeles usually provides the men when called by the employer. Arbitrary hiring and firing procedures, existing prior to unionization, have been stopped, bringing an element of stability into employment conditions.

2. *Wages.* An immediate result of unionization in the 1930's was an increase in monthly cash wages.<sup>27</sup> At the present time, milkers in the bay area receive up to \$260 per month when milking 26-30

<sup>26</sup> *Some Aspects of the Operation of the Ceiling on Dairy Workers' Wages in the L. A. Milkshed Area*, by W. H. Metzler, U.S.D.A., B.A.E. (unpublished).

<sup>27</sup> Cf. Jamieson, *op. cit.*, pp. 156, 160. As to the question whether wages can be raised through collective bargaining, see A. Ross, *op. cit.*, pp. 19, 113 f.

cows by hand or 47-55 by machine, or \$270 where milkhouse work is included. Wages are exclusive of room and board. "Where the employer *boards* the employees he . . . may deduct \$45 per month" and "where the employee *rents* a house from his employer, this employee shall be charged not more than \$20 per month rental for such house. Such charge may be deducted from the employees' wages." In Los Angeles a guaranteed minimum pay of machine and hand milkers has been established at \$285 per month from which \$55 could be deducted "as allowances for board and room."<sup>28</sup> Feeders and green hay haulers receive \$250, cow washers \$255, milkhouse employees \$260 and maintenance men \$245.<sup>29</sup>

Milkers also receive additional compensation for "extra-poundage," i.e. any quantity of milk produced over and above a certain predetermined "regular production." According to union interpretation, regular production is that quantity of milk which can be produced on the average within eight hours of work. This additional compensation may raise a milker's "take-home-pay" considerably. After computation of extra-poundage and other additions, earnings of \$350-\$400 (and over) are common in the Los Angeles milkshed.<sup>30</sup> These high take-home pays make the milkers the best paid regularly employed agricultural worker in the United States.

Is the compensation for high production per cow an *incentive payment*, or is it a pay for *overtime*? Both interpretations are possible. The unions deny that it is an incentive pay, mainly because the productivity of a cow is limited by nature. But extra-poundage payments induce the milkers to take an interest in high productivity, encourages them to use care in the milking process and the feeding of the cows, because any additional milk produced will show up in the final pay check. Since the interest of the operators in heavy milk production is shared by the union, this may be considered as a "method of integrating the union constructively into

<sup>28</sup> In 1933, wages of milkers in the L. A. region were about \$70-\$90 per month where workers boarded themselves.

<sup>29</sup> According to a B.A.E. sample analysis made in April 1944, the average pay on 10 dairies was \$256.60, with a range of \$245-\$367; in December 1944 wages ranged from \$270-\$420 with an average of over \$300. An average of \$350 may be representative for 1949. In San Francisco, it may be estimated at around \$300. Hand milkers draw higher wages because of the high production of cows milked by hand.

<sup>30</sup> In Los Angeles, milkers also receive \$7.50 per month for each "turn-in over and above the third turn-in," i.e., if they are required to drive into, or out of, the barn more than three strings per milking.

the operation of the business enterprise."<sup>31</sup> Extra compensation is interpreted by the unions as an overtime pay and an arrangement which does justice to the diverse conditions existing on dairies. Since wages are *not* based on an eight-hour day, and since the working-day still at present averages 10 hours, it is claimed that "heavier production requires heavier work" and should therefore be compensated. (If high producing cows milk out faster than others, then the argument is faulty.) "Regular production" has been determined in a way which permits ample possibilities for making "extra poundage" no matter how much more time is used in producing the latter.

"Extra poundage" is determined by the weighing of milk. The bay area milkers "may be required to weigh their own milk" at each milking. In the Los Angeles dairies the "production shall be computed by one weigh day per month, weigh man to be furnished by the employer. . . . The Union may call for weigh day of its own." The latter method has resulted in some friction between employers and men. According to the unions this problem can be solved only if wages are put on a straight hourly basis.

During the war, in April 1944, a request was made by the dairy-men and dairy associations to impose a wage ceiling on milkers' wages.<sup>32</sup> The wage ceiling was ordered by the W.F.A. and provided for a base pay for milkers of \$205, plus extra compensation for above-regular production. The ceiling was thus stated in terms of the union contract, but enforcement proved to be an impossibility. The unions and the small dairymen who were already paying wages considerably above the ceiling were seriously opposed to it, the latter since they were menaced by the loss of their men.

The role of the large-scale dairies is noteworthy here: they were "inclined to recommend that the government should begin to enforce the law" (i.e. the ceiling) and were manifestly in a better position to keep their men because of better working conditions, even when paying lower wages than small dairies. If this is true, large-scale dairies are able to introduce imperfections in the labor

<sup>31</sup> Reynolds, *op. cit.*, p. 215 quoting Neil Chamberlain.

<sup>32</sup> "Dairymen bid for milkers like they were on the auction block." "One agricultural official stated that these operators were feeding their workers meat three times a day and were generous with biscuits, pie, wine and other items that would keep them from moving elsewhere" (*Some Aspects of the Operation of the Ceiling . . . , op. cit.*) "Labor pirating" was practiced extensively. Efforts during the war to increase the supply of milkers by training inexperienced men and women in milk schools failed, partly due to the opposition of both unions and employers.

market and show that they have a labor supply problem at hand. This would be particularly significant if large-scale enterprises become relatively more important; they should, seemingly, then become more interested than small-scale operators in the maintenance and cooperation of the unions, if this results in better overall working conditions.

3. *Working conditions.* Nowhere is the similarity between dairy farmers and industrial plants made more evident than by the clauses regulating working conditions in dairies. Some methods of operation, held impracticable only a few years ago, are nothing short of revolutionary. The duties of employers and workers are defined in a fairly precise manner. The bay area contract provides, however, that "details concerning duties not specifically covered in this agreement shall be governed by the prevailing custom" in recognition of the diversity of farm-management methods.

The introduction of the six-day work week in dairies was the most significant achievement. It necessitated the employment of "a relief-milker," an employee who takes the place of the regular milker when the latter is not working by reason of days off or by reason of disability. Here the unions had to overcome the farmers' deep-rooted conviction that cows should not be milked by "strangers" and that relief milkers would lower production. This conviction has proved to be unfounded prejudice. Relief milkers do not lower production nor harm the stock. They are highly skilled in the handling of the stock and command the highest wages.<sup>33</sup> The benefits accruing from the six-day innovation, despite prejudice against it, should be restated when in the future farmers must be convinced that new methods are sometimes desirable in achieving better living conditions for their workers. Such an innovation would be mainly the eight-hour day or the 40-hour week which is, next to the hourly wage rate and overtime pay, one of the most important long-term objectives of the unions.<sup>34</sup>

Under existing conditions, the split-shift is necessary on all dairies. Milkers work usually from one to six a.m. and one to six p.m. or a similar schedule which requires their presence on dairies both in day time and at night.

<sup>33</sup> In the bay area, they receive, for example, \$20 above the regular wage scale if employed by one dairy.

<sup>34</sup> At present milkers themselves may oppose the straight eight-hour day under which cows would have to be milked by different milkers. They prefer to "control the cows" under the existing system.

No less significant is the more recent introduction of paid vacations, and in Los Angeles, of holidays, paid sick leave and severance pay; provisions regulating the maximum number of cows to be milked by hand or machine, and delimiting the work done by various classes of men<sup>35</sup>; seniority in job-openings or lay-offs; compulsory insurance, since dairy workers as agricultural laborers are not covered by federal or state legislation<sup>36</sup>; the regulation of the amount of water pressure in the hoses used in cleaning the barn and the stock before and after milking; the ordering of the amount and type of work to be done by milkers outside of milking itself (if any); and the settlement of disputes and arbitration.

### *Social Implications*

1. The personal relationship between the farmer and the "hired man" has disappeared on unionized farms with evident finality. The traditional contract between agricultural employers and laborers is marked by its initial simplicity, in contrast to the detail of union agreements in delineating impersonally the rights and duties of both parties.

2. The first union agreements contained the statement that the contract between the union and the employers was entered into "in order to prevent unnecessary labor disputes, and to establish uniform wages and conditions of employment." It is uncertain to what extent the latter objective has been reached. Unionization must necessarily leave a mark on conditions existing in the industry, but differences still exist between the Grade A and the Grade B dairies. Wages on unionized dairies also lack uniformity because of the varying productivity of cows milked. In the main, however, union workers are assured equal treatment, and arbitrariness in the treatment of the men has been eliminated.<sup>37</sup>

To some extent the agreements "freeze," at least theoretically,

<sup>35</sup> For instance milkers milking from 51-55 cows "shall not be required to perform any other duties except milking and the driving in and out of the milk barn his string of cows" (sic).

<sup>36</sup> The exclusion of dairy workers from such legislation is becoming an anachronism. Why should a milkhouse employee on an industrialized dairy be considered an agricultural worker for instance but a milk processor an industrial worker? Why is a "transport driver" working on a dairy, and a member of Local 737, an industrial worker, as decided by the Social Security Board in Los Angeles?

<sup>37</sup> It is the duty of foremen or operators to distribute the cows in a manner which will equalize the productivity in the strings.—In this connection cf. the statement that there is "a tendency toward higher cash wages for all jobs as the size of the dairy increases." *Labor and Other Factors . . . op. cit.*, p. 20 ff.

employment and working conditions. The employers criticize this rigidity and maintain, for example, that new milking equipment would enable a milker to handle more than the maximum number of cows permitted by the contract. Since most milkers work more than eight hours a day, the unions, in reality, are not opposed to labor saving equipment if it cuts the number of hours on the job, unless it also reduces the number of men employed.

3. How does the new pattern in the dairy industry affect the employers and the dairy-workers? It has been stated<sup>38</sup> that in general "dairy farmers . . . are especially aware of the close relationship that exists between themselves and the townspeople." We must go further: large-scale dairies have little, if anything, of a "way of life" different from urban life. Their operators could rightly claim that "We are not husbandmen. We are not farmers. We are producing a product to sell."<sup>39</sup>

The unions claim to have as their members the best milkers in the state, since a good man will join the union in order to get the highest wages paid for that type of work. Most employers interviewed agree to that statement. There has been a considerable change in the type of men now taking jobs as milkers on dairies. Whereas formerly the majority were unmarried men with little propensity to "stay put," who left positions with relative ease and thus contributed to a considerable turnover of manpower on dairies, now older, married men interested in long-term employment make up a strong share of the dairy labor force. To some extent unionization has improved the social status of these agricultural workers and increased stability and job security in the industry. At present, the labor turnover is said to be small on the unionized dairies, though other causes, like economic and housing conditions, etc., contribute somewhat to stability. The hired worker is no longer the forgotten man in agriculture.

4. Could the "agricultural ladder"—a concept intimately tied to the family-type operation in a free-enterprise economy—be more easily climbed upward under the kind of industrialized farming which exists in California than on the traditional small scale farms? It has been shown recently in striking figures that farm workers in the United States, and particularly on the Pacific Coast, ex-

<sup>38</sup> Cf. Raper, *op. cit.*, p. 422.

<sup>39</sup> LaFollette Hearings part 53, p. 19444.



perienced a general downward shift in tenure status after 1880.<sup>40</sup> That hired men had no chance to climb the agricultural ladder was mainly due to the low wages usually paid them. The high wages received by the industrialized milkers and dairy workers may give, and has in some cases already given, them a greater opportunity of attaining a higher social status—such as tenant or owner—if other things remain equal. It would be interesting to find out whether the social position of rural workers could be improved if the agricultural ladder's first rung were made more secure for further climbing by the aid of a program based on trade-union principles.<sup>41</sup>

#### IV. Conclusions

The significance of collective bargaining in the dairy industry is obvious: the existence of the Milkers' Unions has created a wedge in agricultural labor. Collective bargaining has been more or less successfully established in one phase of California agriculture for a period of a decade and a half. To a certain extent, the success of the Milkers' Unions can be attributed to the peculiar economic conditions prevailing in the two milksheds. It remains to be seen whether collective bargaining can be equally successful in other agricultural industries which depend heavily on the employment of agricultural labor—like those employing seasonal labor—as the scale of operation of farm enterprises in the United States increases, and as methods of farming become ever more rationalized. Collective bargaining has been carried on satisfactorily between hired men and operators even on relatively small dairies, employing only a few men. One of the most significant aspects of our example is that it has shown conclusively that conditions of work and some traditional methods of farming, conceived of as unalterable, can be changed and improved by mutual consent. Collective bargaining has led to an improvement in the social and economic status of dairy employees by introducing a certain balance of control which is essential for industrial—and agricultural—democracy in our system of private enterprise.

<sup>40</sup> *Trends in the Tenure Status of Farm Workers in the U.S. Since 1880*, U.S.D.A., B.A.E., July 1949, pp. 1, 27, 33.

<sup>41</sup> "Workers Agricultural Programmes in Austria, England and Germany," in: *International Labour Review*, 1929, vol. 19, pp. 681 ff.

## NOTES

### TECHNICAL PROGRESS IN AGRICULTURE

**T**HE last 50 years have brought a dramatic increase in the physical productivity of agriculture in the United States. Crop production in 1949 was twice as great as the output 50 years ago. Furthermore, a smaller farm labor force now is needed. In the last 20 years alone average crop yields have increased 50 percent.

Aside from increasing yields, many other equally important advancements have occurred. Most fruits, vegetables, and field crops, for example, have been adapted to wider areas of production. The area of commercial corn production has been extended hundreds of miles to the north and west through development of early maturing varieties. Wheat varieties have been developed that mature in advance of the hottest weather in the Great Plains. Cotton production has been extended into the high plains and the irrigated valleys of the Southwest.

Significant progress has also been made in the field of soil management and fertilizers. A modern concept of soils has evolved, founded on the understanding that soil undergoes constant changes—some natural and some man-made. As a result of increasing knowledge of soil types, their composition and structure; of crop requirements with respect to fertility and moisture; and of the over-all relationships of the many factors in production, management practices fitted to the soil conditions of particular fields and farms or of entire areas have evolved.

Because new techniques based on research findings have been put to use on many farms throughout the country, productivity is on the come-back in many areas where yields were falling off because of declining soil fertility. Some land once considered worn out is yielding abundantly, and some where soil fertility was naturally too low for economic production is being cropped profitably. On hundreds of thousands of farms in the eastern part of the United States the soil is much better today, as a result of good management, than it ever was under natural conditions.

Now—what about the next 50 years? It is my considered opinion that science has no more than made a beginning in advancing agriculture in the United States. In fact, the big harvest is still ahead. The stage is set with enormous possibilities.

Science has become highly specialized. With this specialization we have switched from the individual approach to the group attack on difficult problems. In agriculture this has resulted in the development of excellent teamwork between State and Federal research agencies on the one hand, and among groups of States and the Federal Government on the other.

Science is now "tooled up" with raw materials, devices, and techniques that are speeding up many phases of agricultural research and opening new doors of opportunity. For example, ultrasonic vibrations, ultraviolet rays, X-rays and electronic devices have become everyday laboratory equipment. The availability of radioactive isotopes has made possible a wide variety of studies heretofore impossible concerning the principles of soil chemistry and plant physiology. Drugs, such as colchicine, antibiotics, and growth-regulating compounds, are being used to change the heredity or physiology of plants.

Plant explorers have re-combed areas of ancient civilization for plant materials that may be of value. The flow of foreign germ plasm to this country has been doubled during recent years. Plant "blood banks" have been organized at several locations where germ plasm is being catalogued, retained, propagated, and made available to plant breeders. The impact from this expanded supply of raw materials, and tools for working with it, will be felt in crop betterment in the years ahead. Many improvements already are in the making.

We have merely penetrated the fringe in capturing hybrid vigor in crops. Our initial success with corn stimulated intensive investigation with many other crops. For most plants, however, the problem is much more complex than with corn. Because the flowers of most plants, unlike corn, contain both male and female organs, there is no feasible mechanical means of clipping pollen-bearing stamens to prevent self-pollination and enforce a pure cross.

Hybrid alfalfas have been developed, but at present they do not appear as promising as new synthetic varieties developed through complex methods of cross breeding. Generally this holds true for most of the legume and grass crops. Forage crop breeding is about 20 years behind breeding programs with other crops. There are more than 6,000 known species of grasses alone, and the plant breeders have only scratched the surface in exploring possibilities of their use and improvement.

Much remains to be learned about the best teammates in grasses and legumes—the mixtures of species that complement each other. The breeders are working on species that in combination will produce forage earlier in the spring, during the heat of the summer, through the cool weather of fall, and even during favorable periods in winter.

There are other potentialities, too, such as improving the physiological efficiency of plants. As we move ahead along this line we can expect superior crop varieties that make more efficient use of moisture, plant nutrients, oxygen, carbon dioxide, and light.

We are also learning how to improve the nutritional value of crops by increasing the content of vitamins, minerals, and certain amino acids through plant breeding. Corn breeders, for example, believe they can step up the nutritional value of corn by as much as 15 percent. They are also working on corn varieties with higher oil content for industrial uses, and are finding that it can be tripled through breeding and selection. Corn oil is worth four to five times as much as starch to the wet-milling industry.

The industrial value of other crops, too, is being increased. Cotton breeders have developed complex "triple hybrids" through the use of American wild cotton, Asiatic cotton, and cultivated Upland cotton that offer encouraging potentialities for cotton to compete with synthetic fibers. They have a range of fiber strength almost double that of present commercial varieties. Intensified fiber strength is essential to increasing yarn strength, and that is necessary if cotton is to compete with synthetic fibers. The new hybrids are still in the developmental stage, but are far enough along to have several strains included in spinning tests this year.

Among the many potentials, the integrated approach to crop production research is one of the most promising. The use of multifactor experiments permits simultaneous evaluation of several plant-growth factors individually and in combination. It offers opportunity for finding and capitalizing on the most productive combinations of practices affecting crop growth.

The integrated approach was used to crack the problem of low corn yields in the South. I am sure many readers of this article are familiar with our corn research, started in cooperation with the North Carolina Agricultural Experiment Station in 1944, in which we sought to determine the best combination of germ plasm, amount and timing of fertilization, closeness of spacing, methods of

cultivation, and other cultural practices. Many also are aware that this work has spread throughout the Southeast.

Using this combination approach, over 55,000 farmer demonstrators in seven states have produced an average corn yield of 70 bushels per acre, over 8,000 have exceeded 100 bushels per acre, and a few yields exceeding 200 bushels have been obtained. Average corn yields in this area in 1949 were 60 percent higher than before the new practice combinations were worked out, despite the fact that only a small percentage of the farmers are using them so far.

The same principle is being applied to other crops—and in other areas. In our irrigation research in the West, where we are able to control water in addition to the other factors, exceptional crop yields are becoming commonplace. We have had corn yields as high as 206 bushels, grain sorghum yields as high as 174 bushels, oat yields as high as 114 bushels, barley yields up to 91 bushels, potato yields up to 648 bushels, sugar beet yields as high as 40 tons, and alfalfa yields as high as 10 tons to the acre.

Several significant points are apparent from findings resulting from this new research approach. Most important to the fertilizer industry is the fact that maximum benefits from fertilizers can be realized only when all other production factors are in proper balance. As we find the best practice combinations for various crops, we will need to raise our sights regarding economical rates of fertilizer application.

I am convinced that during the next 10 or 20 years research aimed at combining the best technologies for the various crops will have a greater impact on increasing the efficiency with which farmers produce them than any other single advancement.

In total, the potentialities for progress in agronomy during the next half century are almost beyond comprehension. To me it seems obvious that we can anticipate great advances, many of which will have an important bearing on our agricultural economy.

Whether we will capitalize fully on the advantages of these advances is another question. In my mind, the problem of using advancing technology to its full potential in achieving a balanced agriculture constitutes a major challenge to every man who concerns himself with the welfare of that field. By a balanced agriculture I mean a system of efficient production that will maintain or improve our soil resources, that will solve our surplus problems, that will provide parity income for farm families, and that will

meet national nutritional needs and also furnish raw materials for industry.

I am firmly convinced that we could make better use of technology in achieving a balanced agriculture if—and these are big “ifs”—if we could find ways for getting new technology into use on farms more quickly, and if we could develop alternate but equally profitable enterprises for specific farming areas.

How can the “ifs” be removed? One approach might be to take a leaf from our book of industrial progress. When a new product or process is developed in commercial industry, it goes through a period of pilot plant study before the final workable process or equipment is introduced. This is true no matter how sound and feasible the new development may be.

In agriculture, individual farmers have carried the responsibility and expense for the pilot-plant stage. The farmer is offered a new technique, but it is up to him to fit it into his type of operation. While he may have an opportunity to see a working model at the experiment station demonstrating the principle involved, he has to rely on his own ability to adapt it to his farm plan and economic set-up. This slows up the process of putting new techniques, especially the more complex ones, into use on farms generally.

In a few areas special effort has been directed along the general lines of developing a proving-ground system for new technology in agriculture comparable to that in industry. The experience gained offers a source of information for developing a method of pilot-plant study for agriculture.

About ten years ago the Alabama Experiment Station set up several farms where the findings from research at the station could be worked into a balanced farm plan. The entire program is developed to parallel as largely as possible what any farmer on a similar farm could do in converting from a single cotton enterprise to a more diversified farm plan. It provides for conversion by degrees so that learning new enterprises and financing them can be cared for safely. It offers opportunity to test different possibilities.

With their records of yields, income, and costs, these farms are in reality pilot-plant operations. The results achieved offer cotton farmers a proved system to follow with whatever modification may be appropriate in making their own conversions to diversified enterprises.

The initial results were so encouraging that the Alabama Station



has expanded its program of pilot-research farms. Their project now includes pilot research studies for cotton-hog enterprises, cotton-dairy, cotton-poultry, and cotton-beef enterprises. These pilot-research farms have caught the interest of many farmers in the area. There is no question but that thousands of farm families in Alabama this year are adjusting their farming operations in line with cotton allotments with less difficulty and financial loss as a result of findings discovered at the pilot-research farms.

Other State experiment stations are also interested in this plan. Mississippi is already trying it, and several others are investigating it.

For maximum effectiveness of pilot-research farms, present educational programs need to be strengthened with such devices as test demonstration farms and local farm management services. The test demonstration farm idea has been used to good advantage in the Tennessee Valley. Here the farmers in a given community select one farmer from their group to use his farm as a test-demonstration unit in developing a balanced program of farm management. The idea is that other farmers in the community will adopt improved management practices after observing them in operation on their neighbor's place. Those of my readers who know that area will, I am sure, agree that a notable improvement in farm management has been evident throughout the area since the idea was started.

The local farm management service was first tried in Missouri. Here groups of farmers associate themselves to hire a farm management expert whose job is to translate the best technical information available into balanced farming programs for their individual farms. Outstanding results already achieved in Missouri and the spread of the plan to other Midwestern States are evidence of its practical merit.

These pilot-research farms, test-demonstration farms, and farm management services offer a source of experience from which methods may be found for making better use of technology in achieving a balanced agriculture. If the strong features from each were combined, a program might be developed to function along the following general pattern:

New technology developed through applied research would be tested at pilot-research farms—not as separate practices, but as integral parts of a complete farming operation. In some areas new

farming enterprises would be developed and perfected to fit local economic and social conditions. Teams of specialized scientists would plan and interpret the tests. Such research farms would be located at proper places and in sufficient numbers to test practices under a variety of soil conditions and types of farming.

As a result of this pilot farm research, definite recommendations could be made in terms of farming systems. These suggestions could be put into operation on unit demonstration farms where the operators agreed to take the slight additional risk and keep accurate records in return for the special help they received. A unit demonstration farm would be needed within easy driving distance of every farm in the country, so that every farm operator could see the best practices and new enterprises in operation on a farm like his own, run by a farmer like himself. A farm management service would be operated by a team of workers in each county to help individual farmers in developing plans for balanced farming.

A program of this type might furnish the basis for a more orderly application of the action programs in agriculture. Plans for soil conservation incentives and technical services, agricultural credit, production incentives, and *farm price supports* might be knitted together for each individual farm and directed toward the goal of balanced agriculture.

I realize that if such a program were initiated immediately it would take several years before its full value could be realized. Once geared up, however, it could become the foundation for a permanent efficient agriculture bringing stability to the entire national economy. Such a program would be invaluable in helping the nation to realize the full advantages from new agronomic information currently in the making or in prospect.

Now, in conclusion, I should like to summarize. Changes of the past half century have revolutionized American agriculture as the result of technological advances growing out of agricultural research. The production capacity of our farm plant, and the efficiency of its operation, *have been doubled*. Viewed in retrospect from the year 2000, however, the gains realized during the past 50 years may seem small when compared with those of the next 50 years, as indicated in present potentials.

Whether these potentials are realized will depend in a large measure on the stress given agricultural research. Greater emphasis could quicken both the development and adoption of new tech-

nology, while a slackening in our research effort could jeopardize these opportunities.

To harness technological advancements to their full potential in achieving a *balanced* agriculture is one of our most pressing problems. If solution is found, then the twentieth century will truly be the greatest century of agronomic progress in the history of man.

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### ECONOMIC ASPECTS OF TECHNICAL PROGRESS

IN THE preceding note Dr. Salter has presented a well-rounded short discussion of our past record and future potentialities of technical progress. And he has not avoided some of the difficult problems that frequently are associated with technical changes. In fact, he has suggested certain ameliorative measures to deal with those problems in order to help farmers adjust their operations to these changes.

Natural scientists and engineers sometimes have assumed implicitly that all technical changes almost immediately result in economic benefits to farmers. Salter, however, recognizes that this is much too optimistic a view. Agricultural economists, on the other hand, have tended to be too pessimistic about potential benefits to farmers of cost-reducing improvements. They have emphasized the larger output that is frequently associated with technological changes, and recognizing that demand for most farm products is inelastic, they have reached the conclusion that the benefits tend to be shifted away from farmers to other groups in the economy. The writer agrees with Dr. Salter on a middle ground position.<sup>1</sup> There are problems aplenty, but in the longer view farmers have benefited along with other groups, and it is quite possible to enlist science in the service of all farm people.

In looking forward to production potentialities for the next 50 years, Dr. Salter finds himself taking the optimistic view. Although he does not mention the "starvation versus abundance" controversy, his discussion does tend to dispel the specter of famine for the western world. Both Dr. Salter and his associate, Dr. Kellogg,

<sup>1</sup> For statements by the writer on economic consequences of technological changes, see USDA Misc. Pub. No. 707, "Changes in American Farming," pp. 67-75; also article entitled "Technological Changes and the Future of Rural Life," this *Journal*, May 1950.

have been optimistic about food production potentialities in other writings.<sup>2</sup> This view assumes progress toward peace and reestablishment of freer trade relationships among food surplus and food deficit nations. With existing trade gaps the United Kingdom, for example, is encountering serious difficulty in producing 50 percent of the food needs for its 50 million people, whereas we are facing surplus situations in wheat and feed grains.

Within our own country adjustments to technical changes are made more difficult by the episodic nature of these developments. We cannot predict when an improvement such as hybrid seed corn is likely to be discovered or when a workable cotton picker will be invented. Usually, however, some time elapses before such improvements are adopted by farmers after they appear on the horizon. The time period varies with the complexity and cost of the improvement, but it took 10 to 12 years to obtain general adoption of hybrid seed corn in the North Central States. That improvement involved only a change in the source and the cost of the seed supply, once suitable hybrids had been developed.

The adoption period does furnish some opportunity for adjustment to change; but if hybrid seed corn increases corn yields 20 percent in a period when we are already struggling with a surplus situation in feed grains, or if a cotton picker is adopted in a period when no off-farm employment is available for the displaced labor, obviously those developments tend to aggravate the unbalance. But on the other hand, we must not forget that if they come in a period of rising demand for farm products and short labor supplies they have the opposite effects. In the depression of the 1930's there were some suggestions that technical improvements in agriculture should be controlled and released for utilization when demand for farm products was increasing, because only in such periods would farmers benefit. Certain industrial patents have been held for adoption until more favorable economic conditions developed.

But such control tends to stifle the march of progress. We should look for other ways of bringing agriculture into balance with scientific advances. Dr. Salter's suggestions include: (1) getting the new technology into use on farms more quickly, and (2) developing alternative enterprises for farming areas.

<sup>2</sup> See for example: Robert M. Salter, "World Soil and Fertilizer Resources in Relation to Food Needs," *Science*, V105, pp. 533-38, 1947. And Charles E. Kellogg, "Food Production Potentialities and Problems," this *Journal*, Proceedings number, February 1949.

Farmers who first adopt an improvement which actually reduces costs hold all of the gain until or unless the prices of farm products are affected by larger supplies. Those who do not make the change are not affected unless farm prices decline. But we have seen that if the development results in labor displacement, hired labor may be adversely affected unless other suitable employment is available. This sequence of events indicates that in speeding adoption of an improvement we need to give special attention (1) to its effects on market supplies of farm products, (2) to removing the obstacles to adoption on some farms, and (3) to alleviating potential labor displacement.<sup>3</sup>

The writer would broaden Dr. Salter's second suggestion to include development of production combinations (new farming systems) which enable farmers to *produce more farm products at a lower total cost* than was formerly incurred for a smaller output.<sup>4</sup> By adopting mechanical power and other improved practices, farmers in many areas have been able to achieve new production combinations that actually lowered total costs. It has usually involved less hired labor, and frequently fewer and larger farms. But *per capita output* and *net income* has increased.

If new, low-cost farming systems are to be developed for a farming area where drastic changes are needed, the agricultural economists and the natural scientists will need to cooperate in analyzing available data, in order to develop farm budgets that give promise of lowering costs and increasing incomes.<sup>5</sup> But such budgets are analogous to an architect's plan for a new building. They need to be tried out on actual farms before we can feel certain of their potential effects on costs and net income. It is in this process of testing research and bringing the results to the attention of farmers that hearty endorsement should be given to the suggestions for development of more pilot-research farms, effective test demonstration farms, and local farm management services.<sup>6</sup>

<sup>3</sup> If a support price is in effect which is not directly related to the costs of the specific product, the farm price may not be affected by the larger output, but the pressure of increased supplies may result in tighter production restrictions.

<sup>4</sup> This point is discussed more fully in USDA Misc. Pub. No. 707, pp. 67 and 68.

<sup>5</sup> For one example of cooperative work along this line see North Carolina Agr. Exp. Sta. Tech. Bulletins No. 87 and 89, "Opportunities for Adjustments in Farming Systems, Southern Piedmont Area," and "Investment Credit to Improve Farming Systems."

<sup>6</sup> The writer arranged a program for the 1946 annual meeting of the association on that general theme. See papers by M. L. Wilson and H. M. Dixon, George W. Westcott and Charles E. Kellogg in *this Journal*, Proceedings number, 1947.

Attempts at farm scale research in this country can be traced back at least to the demonstration farms started by Dr. W. J. Spillman and mentioned in the report of the Secretary of Agriculture for 1902. But agricultural research was new in those days. And the need for considering the farm as a unit was only a gleam in the eye of men with the vision of Dr. Spillman. Consequently, this attempt was not very successful. The Fairway Farms Experiment in Montana, started by Dr. M. L. Wilson in 1925, ran into a period of drought and depression which bankrupted most farmers in the areas where these farms were located.

But these early attempts have furnished a background of experience, which together with the research and educational foundation that we have developed, should enable us to build a more permanent program of farm scale research, testing, demonstration and service to farmers. The recent attempts cited by Dr. Salter show more promise. It is true that some of these have benefited by an upward trend in farm prices, but their usefulness should not be questioned on those grounds. An integrated and fully developed program of this kind could do much to bring agriculture into balance not only with technical advances but with other changes as well.

Dr. Salter mentions that such a program might serve as the vehicle for carrying out soil conservation, credit, production adjustments and price support programs on individual farms. Our goal should be balanced farming on individual farms which in the aggregate would coincide with balanced production from our entire farm plant—balanced in relation to prospective peacetime markets. This is an achievable goal. But to gain it will require some redirection of both research and other programs. For example, if less wheat and more grass in the Great Plains is a desirable objective, how do we facilitate adjustments in that direction? We need first of all the development of suitable grasses and legumes which will thrive in and maintain the soils of that region. This is a natural science research problem. Then it is necessary to determine whether a shift from wheat to grass would be profitable to farmers, and under what conditions it would pay them to change. That is a problem for economic research, building on the research results of the natural scientists. But if such a shift is not likely to be profitable, can present programs be adjusted or new ones devised to make it pay? This is a program job. And when profitable opportuni-



ties are available, educational work is needed to call attention to the financial advantages of shifts in this direction.

These steps do need to be integrated in ways suggested by Dr. Salter. The writer also would add two other points: giving special attention to small farms, and finding other employment opportunities for displaced labor. Opportunities for shifting, and taking advantage of new technologies usually are less pronounced on the smaller farms. This may call for more intensive farm management assistance to those farmers, especially in the early stages.<sup>7</sup> In areas where rather drastic changes in farming are needed, consideration also might be given to organizing apprenticeship training in the new types of farming, particularly for younger workers who will find their best opportunity in this field.<sup>8</sup>

But a balanced agriculture cannot be achieved unless other employment is available for those no longer needed in farming after the producing capacity of each farm worker has been greatly increased. Although space does not permit elaboration here, effective programs for facilitating transfer to non-farm employment might be of great benefit to farm people.

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### SOME CHARACTERISTICS OF AGRICULTURAL LAND LEASING IN EGYPT\*

ONLY about three percent of Egypt's 386,000 square miles of territory is cultivable. This cultivable area involves about 8,000,000 feddans,<sup>1</sup> all of which is completely dependent on the irrigation waters received from the Nile. Because of rainfall<sup>2</sup> and topographic conditions, Egypt's economic supply of agricultural land is practically fixed.

With 75 percent of its 20 million population depending on agri-

<sup>7</sup> An experimental project to help low-income farmers in shifting to better paying systems was started by the Farm Security Administration in cooperation with the Bureau of Agricultural Economics in Heard County, Georgia in 1942. Despite the war and changes in administration of programs for low-income farmers some of these farmers have carried out the original plans very successfully.

<sup>8</sup> See article by writer entitled, "For Farm Consultants," *Land Policy Review*, August 1941.

\* The author wishes to express his appreciation to Raleigh Barlowe for encouragement in the preparation of this article and assistance in the final drafting of the manuscript *Journal Article 1148*, Michigan Agr. Exp. Sta.

<sup>1</sup> The feddan is the measure of land area in Egypt. It equals 1.038 acres.

<sup>2</sup> The average annual rainfall is about 8 inches along the Mediterranean coast and less than two inches in Middle Egypt.

culture for their livelihood, Egypt has the highest man-land ratio in the world. The comparative lack of alternative opportunities for industrial employment has contributed to overcrowded conditions in agriculture. This, in conjunction with a very high net human reproduction rate, an almost fixed supply of agricultural land, and the concentration of land holdings in relatively few hands, explains the existence of large numbers of landless agricultural laborers who offer their services for very low wages, and tenants who willingly pay the very high rents asked by the landowners.

The fact that the bulk of the political as well as economic power in Egypt is concentrated in the hands of the landowners has considerable bearing on agricultural land leasing practices. Landlord-tenant relations are affected, indeed dominated, by the strong bargaining position of landowners. The importance of this relationship is readily apparent in the following description of the leading characteristics of agricultural land leasing in Egypt.

### *I. Forms of Rental Payment*

Rental payments in Egypt differ widely from one area to another according to custom, fertility of the soil, and kinds of crops raised. In some areas rents are usually paid in cash, while in others share rent is the common form of payment. In still other areas rents ordinarily are paid in both cash and kind. The following are the most common forms of rental payment in the country:

#### *(1) Cash rents*

This is the most widely used rental arrangement in Egypt. In 1939 about 66 percent of the total area leased was paid for in cash. It is the method usually employed by the Bureau of Public Domain, the Ministry of Wakfs, the Royal Wakfs, and by individuals owning large estates. Many land owners insist that their cash tenants pay varying amounts of money as a deposit before leasing land to them. These deposits vary according to the amount of annual rent that ordinarily would be paid by the end of the year. So far as time of cash rental payment is concerned, three different methods are in common use. These are:

(a) Payment of the entire rent once a year. Under this arrangement the whole amount must usually be paid in October or early November in the areas that produce cotton or rice as cash crops. In those producing sugar cane, rents are usually

paid in January or February when the crop goes to the sugar factories.

(b) Payment of rent in two installments. The first amount, one-third of the entire rent, is paid from winter crops such as wheat, barley, beans, etc., while the remaining two-thirds is paid from summer produce such as cotton and rice. The tenant usually is required to pay the amount due before he harvests the crop except in those cases in which he pays a deposit. This provision enables the landlord to take legal action against his tenant while the crop is still in the field should the tenant fail to pay his rent on time.

(c) Payment of rent in three installments. This method has three variations:

(x) One-sixth of the rent is paid from Barseam (the Egyptian clover); one-sixth from wheat, barley and beans; and the remaining two-thirds from cotton.

(y) One-third of the rent to be paid from Barseam, one-third from wheat and beans, and one-third from cotton and corn. This method is used in the province of Giza where considerable Barseam is grown for the dairy farms found in the vicinity of Cairo.

(z) One-fourth of the rent is paid from wheat and winter crops, one-half from cotton and summer produce, and one-fourth from corn and other Nily crops.<sup>3</sup> This rental payment method is generally followed by the tenants of small holdings.

## (2) *Share rents*

Share renting is not as common in Egypt as cash renting. In 1939 only five percent of the total farm area was reported using this procedure, with an additional 29 percent employing other non-cash forms of rental payment. Share renting, sharing of the crop by the landlord and the tenant, usually occurs on small tracts of land and in cases where the period of lease is limited to one crop only. The proportioning of the crop between owner and tenant differs according to population pressure in the different areas and the production costs paid by the two parties. The principal arrangements can be summarized as follows:

(a) Where the owner pays the taxes and buys the seed, ferti-

<sup>3</sup> Nily crop is any crop sowed any time after June and usually harvested before December of the same year.

lizer, and the working animals, and bears half the cost of cotton-picking, with the tenant providing all the labor and paying half the cost of cotton picking; the owner gets five-sixths of the crop and the tenant one-sixth.

(b) Where the owner pays the taxes and buys seed and fertilizer while the tenant provides the labor and the cost of cotton picking, the owner receives four-fifths of the crop and the tenant one-fifth.

(c) Where the owner pays nothing except the land tax and the tenant pays all the other costs, the owner gets three-fourths of the crop and the tenant one-fourth.

(d) Where the owner pays only two-thirds of the land tax while the tenant bears the production costs plus one-third of the tax, the owner retains two-thirds of the crop and the tenant gets one-third.

(e) Where the owner does not pay anything and the tenant sustains the production costs plus the entire amount of the tax, the owner gets one-half of the crop and the tenant the other half.

These are the common share renting arrangements followed in Egypt. In some areas variations of these procedures are used, based mostly on local custom and the bargaining power of the parties. The profitability of each method to the land owner or to the tenant depends on factors such as the fertility of the soil, the prices of the different products and so forth.

### (3) *Rent in kind*

Payment of rent in kind instead of cash is not unusual in Egypt. The two common procedures are:

(a) Instead of paying rent in cash, the land owner and the tenant agree that the tenant will pay the owner a set amount of cotton, wheat or some other crop, the value of which is equivalent to the rent. In computing the value the local market price is used.

(b) The tenant pays a certain amount of each crop to the owner and takes whatever is left for himself. This method is used when the land is rented for a period of one crop only. In estimating the amount to be paid by the tenant, the fertility of the soil and the demand for land in the area are usually considered. In Monofiah province, for example, it is common practice for the

owner to receive two or three kantars<sup>4</sup> of cotton for each feddan producing cotton and five or six ardebs<sup>5</sup> of corn for each feddan producing corn. Under such arrangements the tenant has to pay the amount agreed upon, even if it is all that he is able to produce on the land.

#### (4) *Cash and kind rent*

This device is a combination of the first and the third methods. Under it the two parties agree that the tenant shall pay specified amounts of cash plus a certain proportion of the crop. This method usually enables the land owner to take over the entire crop, sell all or part of it to get his share and then give the tenant what remains.

These are the most common procedures for paying rent in Egypt. Cash rent, the prevailing method, is simple and encourages efficiency in production. Under it the tenant reaps all the fruits of his work but he also bears the risk of crop failure and that of price fluctuation. Under share rent, the owner and the tenant both carry the risks of crop failure and price fluctuations; but the tenant may lack incentive for intensifying production to its most efficient point. With rent in kind, the farmer reaps the benefits of any increased production he can secure but bears the risk of crop failure, while the land owner shares with the tenant the hazard of price fluctuation.

The fairness of any method, however, depends upon the amount of rent charged per feddan, whether in cash or in kind, in relation to the fertility of soil and the adaptability of land for the production of different crops. For instance, it would be more profitable to a tenant to pay three kantars of cotton as rent for one feddan that produces six kantars than to pay one kantar of cotton as rent for one feddan that produces three kantars, since he would be left with three kantars in the first case and only two in the second, while his production costs, other than rent, are nearly equal.

## II. *Duration of Leases*

The duration of lease periods varies widely in Egypt. Many leases are only for one crop: that is, five to six months in the case of corn, six months in the case of wheat or Barseam, and ten to

<sup>4</sup> A unit of weight corresponding to the hundredweight, but varying in different localities.

<sup>5</sup> Officially equivalent to 5.62 U. S. bushels, but varying in different localities.

twelve months in the case of cotton. Other leases may run for periods of three years or even longer, but the year to year lease is most common.

The year to year or one crop lease does not give the tenant security of tenure and makes it difficult, if not impossible, for him to plan his farming operations over a period of years. Long leases, on the other hand, are opposed by land owners because they involve bearing the risk of price changes. The use of lease provisions requiring either party to give the other a specified period of advance notice on termination is confined to the contracts between land owners and rental intermediaries who are not actual operating tenants. Small tenants do not profit from such provisions.

### III. *Kinds of Leases and How They Are Negotiated*

Most farm leases in Egypt are merely verbal agreements between landlord and tenant. These oral compacts give rise to numerous misunderstandings that would naturally be less likely to occur with written leases. In some instances drafted contracts are used with small tenants, but they are made usually in one copy only and this is kept by the land owner. In some of the densely populated areas, small tenants sign the contracts before the terms are filled in and the lease is kept by the land owner, who can add whatever terms he wishes; he can even raise the rent if the price of agricultural products goes up. Written agreements made in duplicate, with a copy kept by each party, are usually made only in the case of tenants who rent vast areas and who are actually intermediaries, not real operating tenants. In this respect, the Fellah Department suggests that lease contracts should be made in three copies, one to be kept by each party and the third to be kept by a governmental agency.

Under the usual leasing practice tenants and landlords deal directly with each other. In some cases, however, leases are concluded by way of auction, especially if the land is held by an official agency. Auctioning is more prevalent in large transactions; and it often happens that crowding at the auction, added to ignorance and obstinacy on the part of tenants, leads to the bidding of rents up to exorbitant figures.

### IV. *Security of Occupation, Compensation for Improvements and Penalties for Deterioration*

Most small tenants have little or no security of occupancy. At



the same time the nature of their leases is such that they lack incentive for making land improvements. Neither the problem of insecurity of occupancy nor that of making arrangements for compensating tenants for unexhausted improvements can be dealt with in an adequate manner without notable adjustments in landlord-tenant relationships, especially those involving the duration, nature and registration of leases.

Although practically no lease contracts in Egypt contain provisions concerning compensation for improvements, most leases specify that the tenant must treat the land in a good and proper manner. Most of them also specify that in case of negligence and wasteful practices on the part of the tenant, the land owner can terminate the agreement at once. Thus the land owner's rights are very well taken care of while the rights of the tenant are completely ignored.

#### V. *Intermediaries*

A function similar to that performed by the middleman in the farm marketing process is performed by the intermediaries in the matter of renting. These intermediaries lease lands from the landlords and in turn sublet them to the real operators. They are usually wealthy people who can rent vast areas and pay advance deposits amounting sometimes to the entire annual rent. After concluding their contracts, which usually run for three years, the intermediaries sublet their lands to many small tenants at much higher rates. The presence of these persons in the rental market has contributed to the inflation of rents in Egypt. Of course, the intermediaries carry some risk but in return they charge their tenants higher rents, sometimes double the rent they pay to the land owner. The elimination of these intermediaries could bring reductions in the rents paid by the small tenants without reducing the rental payments that reach the pockets of the land owners.

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#### THE STANFORD FOOD INSTITUTE ON "INTERNATIONAL COMMODITY STOCKPILING AS AN ECONOMIC STABILIZER"\*

**A**MONG the many proposals made in the last score of years for reducing trade-cycle fluctuations, Benjamin Graham's pro-

\* The opinions expressed in this note are those of the author and do not necessarily reflect the opinion of the Office with which he is associated.

posal<sup>1</sup> for stabilizing the prices of a composite commodity unit has received considerable attention among agricultural economists. This attention is understandable because (1) it would become an important factor in agricultural commodity markets and (2) the technique proposed is similar to the buffer-stock operations for individual commodities.

Particular consideration has been given to Mr. Graham's proposal by M. K. Bennett, Joseph S. Davis, and other leading members of the Stanford Food Research Institute. As No. 8 of their Commodity Policy Studies they have published a book, "International Commodity Stockpiling as an Economic Stabilizer."<sup>2</sup>

Mr. Graham's proposal for a Commodity Reserve System (hereafter referred to as CRS) called for the stabilization of the average world price of 15 or more primary commodities. For this purpose there would be set up an international corporation which would buy certain composite "commodity units" for stockpiling whenever their average price is soft and sell them whenever their average price is strong. The purchases would be financed by creating new "money" and the receipts from sales would be used to withdraw such "money" from circulation. To this end, the International Monetary Fund should acquire promissory notes issued by the proposed corporation on the basis of its commodity-unit purchases and in return create "deposit credit" in favor of this corporation. These "deposit credits" would be used like gold in settling international accounts. It is likely that, as long as the world remains short of dollars, most of these "deposit credits" would eventually be presented to the Federal Reserve Banks for exchange against United States dollars.

The Stanford experts have revealed important weaknesses of the Graham proposal. They have also presented useful suggestions for improving it in detail. And they have recommended that the proposal so revised be given further consideration "by an international conference dealing with the problems of international contra-cyclical action."

The Stanford experts consider commodity price stabilization only a means contributing to the primary objective of CRS,

<sup>1</sup> *World Commodities and World Currency*, McGraw-Hill Book Co., Inc., N. Y., 1944. More limited proposals for commodity stockpiling for stabilization purposes were made by the same author in his book, *Storage and Stability, A Modern Ever-Normal Granary*, McGraw-Hill Book Co., Inc., N. Y. 1937.

<sup>2</sup> Stanford University Press, 1949.

namely, reduction of the amplitude of trade-cycle fluctuations. They do not, however, claim that such stabilization would have a definite anti-cyclical effect. They even note that "too little is known" with respect to demand elasticity and other factors to permit a definite judgment as to whether the effect of such price stabilization on industrial output would be favorable or unfavorable. Yet, after discussing the pros and cons, they come to the conclusion that the latter contention would be "less defensible" than the former. (Page 151.)

There is a second objective of CRS—namely, the creation of circumstances favorable to a steadier and steeper rise in production and consumption. (Page 20.) The Stanford experts subscribe to it, but they do not devote much of their discussion to the prospects of achieving this objective. Yet it is by no means self-evident that a CRS would help to attain it. Purchases for stockpiling during a recession would temporarily have an anti-contractionist effect, but the subsequent sales from the stockpile would retard expansion during the recovery. Thus, from the long-run viewpoint, the effects would be similar—though in reversed sequence—to those of production restrictions, which would have a contractionist effect in recession periods but, by preventing surpluses from becoming unmanageable, might remove an obstacle to subsequent expansion. It would require further study to determine which of the two devices would in the long run create a more favorable (or at least a less unfavorable) climate for expansion.

It is evident that some malallocation of resources would result from CRS transactions, but the Stanford experts believe that it would not be important; and they claim that "in any event" it would seem to be no greater, and might be less than in the case of bufferstocks for individual commodities. (Page 125.) This, as such, is a valid claim. However, it is unlikely that as large a number of commodities would become subject to individual bufferstock operations as is proposed to be subject to CRS operations.

CRS operations may have the result of accentuating price depression. This would be the case even if, in certain circumstances, recourse should be taken to transactions in futures. If, in a recovery period, commodity units should be sold because the average price of the selected commodities has increased, these sales would have a depressing effect on the prices of commodities in the unit, which have still remained weak. Similarly, in a recession, commodity-

unit purchases would not only tend to strengthen weak prices; they would also tend to stimulate increases in prices that have remained strong. The majority of the Stanford experts have suggested reducing the danger of such undesirable effects by according to the CRS "administrative authority to alter" the composition of the commodity unit. It is most unlikely that governments would ever grant so much discretion to an international agency.

One of the Stanford experts, Dr. Helen C. Farnsworth, went further and suggested that "an international agency should purchase in a recession period only those commodities (of an authorized group) that are themselves moving down strongly in price under the influence of general price factors. Moreover, during the subsequent recovery phase, it would seem desirable to offer . . . only those commodities in the stockpile that are not continuing to show great weakness." (Page 124, footnote 5.)

Of the various other improvements suggested by the Stanford experts, one calls for excluding coal, petroleum, and pig iron from the composite commodity unit and adding nine other commodities (including rice, linseed, peanuts, hides, and lumber). The reason for the addition is to get broader coverage; that for excluding the three industrial items, high storage costs. Mr. Graham, in a comment added to the book, expressed the belief that the storage costs of these three commodities could be reduced and objected to their elimination because this "would greatly change the relative weights of agricultural and industrial commodities in the unit." (Page 169.)

Another improvement suggested by the Stanford experts would provide for buying in the cheapest market instead of apportioning purchases among markets in the participating countries, as proposed by Mr. Graham. They have also suggested a widening of the spread between buying and selling prices, which is only about 10 percent in the Graham proposal.

The most important contribution of the Stanford experts has been a clear exposition (prepared by Edward S. Shaw with the help of suggestions by Howard S. Ellis) of the weaknesses of Mr. Graham's proposal for financing stockpiling operations by the creation of new "money" (pages 24-44). Rightly it is pointed out that there does not exist a "world-wide shortage in gold reserves" but rather "a maldistribution of monetary reserves"; that countries primarily producing raw materials are not the only ones "lacking

in international purchasing power"; that these problems "bear no simple relation to the price index of the commodity unit"; and that "increases or decreases in money supplies are not synonymous with increases or decreases in levels of money expenditure." Pointing to the experience of the United States with silver, the experts conclude that "if other commodities are joined to silver in monetary reserves and other powerful producing interests are vested with special concern in the money supply, monetary policy bids fair to be hopelessly compromised." In his rejoinder (pages 198 ff.), Mr. Graham did not invalidate any of these objections but merely reiterated that financing CRS through money markets would make it "vulnerable to the vicissitudes of the future." This danger appears to the reviewer to be greater than is admitted by the Stanford experts. This just makes the proposal more problematical, but it must not become a reason for tinkering with our monetary system.

At several places the Stanford experts have suggested granting a high degree of administrative discretion to the management of CRS with respect to important matters, including determination of the price level at which intervention purchases or sales should be made. They give good reasons for this suggestion. However, as they themselves have pointed out, expert judgment still remains subject to grave errors, which may have serious effects on interested producer or consumer groups. Thus, there is some justification for the frequently shown unwillingness of governments to invest independent international experts with discretion concerning such matters.

Rightly the Stanford experts suggest that CRS would not be suitable to deal with problems arising from the transition from war to peace. They are also right when they stress that years will be required to set up a CRS and that, should negotiations begin when we are on the verge of a depression in the post-transition period, these negotiations may not be concluded before the price level has reached its lowest point. On the other hand, advance preparations for such a contingency encounter the difficulty that it is not possible at this time to foresee concretely the economic conditions that will prevail in the post-transition period. Their own formula for determining the price level at which support purchases should begin is tailored to the developments of the 30's; it may or may not fit the conditions in the later 50's or in the 60's.

Considerable changes in our economic conditions would have to occur before a CRS could function effectively. They would, as one can readily agree with the Stanford experts, include the following which may not be realized for some time to come: (1) Reestablishment of some degree of convertibility in international political relations; (2) reasonably settled currency relationships among the more important trading nations (including, at least in the opinion of the reviewer, general currency convertibility); (3) a well-functioning world market free from multifarious obstacles to movements of goods; and (4) a reasonable measure of "congruence" of prices of the common staples in the various world markets. Irrespective of their merits or demerits, effective CRS operations thus may not become feasible for some time to come.

Even if favorable conditions should develop some time in the future, the proposed CRS could, in the opinion of the Stanford experts, "hardly be regarded as a force sufficiently weighty to carry by itself . . . the burden of significantly smoothing cyclical fluctuations." (Page 144.) If, however, resort is to be taken to other contracyclical measures, then the possibility, if not probability, arises of a conflict in the call on resources. The experts do not give enough weight to this prospect but admit, with reference to experience in the 30's, that "national governments might prefer to reserve the facilities and capacities of loan and foreign-exchange markets in periods of recession for other projects than financing international commodity operations." (Page 55.)

In his comments (which have been added to the Stanford study), Mr. Graham has claimed that the authors favor the commodity-reserve idea; but he has criticized their "extremely guarded" language which "may leave this vital point open to some question." Some readers may, however, feel that, if the authors are to be criticized, it should be rather for having underrated the weaknesses of CRS that they themselves have pointed out.

OSCAR ZAGLITS

*Office of Foreign Agricultural Relations*

### TEACHING UNDERGRADUATES IN AGRICULTURAL ECONOMICS

EVERY once in awhile (and probably not often enough) teachers of agricultural economics in our colleges attempt to analyze the objectives they hope to reach with their students and



how they best can attain them. In a recent session on curricula and teaching problems of undergraduates in this subject some of the questions pertaining to this general area were raised.<sup>1</sup> They are presented here in hope that they might stimulate further thought about how college teachers can do a better job. Three broad questions concerning the curriculum of agricultural economics were raised as follows:

1. What is the objective of our teaching efforts? Do we provide ready-made procedures like a cook book? Or do we, as Chancellor Hutchins might advocate, attempt to tune our students in on the "great conversation" concerning economic problems? Or to phrase it differently, should we teach "facts and figures" or "principles"? A middle-of-the-road objective was advanced as being the most usable. The focal point of our efforts must be principles. But such principles must be garnished with enough concrete applications and facts to illustrate the principles and to satisfy the undergraduates' demand for "something practical." The number of universal "rules" is extremely limited in our area of work; however, the raw theoretical approach is probably unpalatable to the majority of college undergraduates.

2. What should be the relationship of the agricultural economics department with other departments of a large university? How much of the training of agricultural economic majors should be delegated to other divisions? Where is the best place to give the student his instruction in accounting, statistics, and basic economics—within our own departments or others? It was recognized that these problems differ widely from campus to campus. Even so, one rather fundamental question of relationship was raised. Will the same beginning course in economic principles be equally adequate for both the students who will take only one or two agricultural economics courses and for those who will major in our field? It was observed that in many instances the "principles" course was developing into a study of the nature of contemporary problems, and failing to justify its name.

3. Is the training offered agricultural economics majors broad enough? In these times of a highly complex society, are we training our graduates for the problems they will meet? Should there be more emphasis placed on courses in sociology, psychology, govern-

<sup>1</sup> An agricultural economics staff seminar at Purdue University led by Dr. Don Paarlberg, Dr. Howard Diesslin and the author of this note.

ment, history, and other social sciences? How well are our students educated for the jobs in administration and salesmanship which they often receive? Are we training our graduates who will not go back to the farm as well as those who will?

In addition to these broad questions concerning our curriculum, some pertinent points about our teaching methods were raised. Three broad questions were considered:

1. What level of approach should be used in presenting the material? There are problems of dealing with "the lower third" as well as the more advanced students in college which are similar to the dilemmas in secondary schools. Are college students ready and able to be treated as adults or must some of the restrictive measures of secondary schools be retained?

2. Do we attempt to cover too much ground in our individual courses? Agricultural economics is such a highly inter-related body of knowledge that admittedly it is a hard task to draw the line between areas. Should the "shot-gun" or "pin-point" approach be used? Do we side-track to explain in our presentations so much that the main point is often covered up and lost? Most courses start with announced objectives. Does a critical examination of the end product show that such goals were reached? The common complaint of instructors is "not enough time." Is this really a valid excuse? Or is it the result of our not being able to sort out the important from the unimportant? How often is the plea of lack of time really the result of insufficient preparation of material to be presented?

3. What is the purpose of the laboratory period in agriculture economics subjects? It would appear that in many instances the scheduling of a "lab" period is the vestigial remnant of our inheritance from our physical science colleagues. How many of the agricultural economics subjects lend themselves to the lab techniques? How often do laboratory periods become an extension of the lecture? Are the laboratory exercises we assign really problems of importance, or do they represent "busy work"? If they are the latter, considerable doubt must be raised as to their usefulness.

R. L. KOHLS

*Purdue University*

## BOOK REVIEWS

*Western Land and Water Use*, Mont H. Saunderson. Norman: University of Oklahoma Press, 1950. Pp. xi, 217. \$3.75.

This small volume is an excellent and timely analysis of major western land use problems and their solution. All types of western lands are carefully considered and a utilization program advanced that will permit these lands to contribute their maximum to the regional and national welfare. The author's quarter of a century of experience and research in the west is reflected in the able manner in which he treats his subject.

This reviewer feels that the author's analysis throughout is sound and agrees with his major recommendations. The author has adhered to basic considerations and sound economic analysis to get his points across. He has not over-emphasized some problems to the exclusion of others to influence unduly the reader toward any one limited and inadequate solution.

In the first section national population trends are analyzed to point out the prospective need of food for the nation during the next twenty-five or fifty years, and the contribution which western lands should make in meeting these needs. The full use of western water resources through expansion of irrigation and industrial operations is the key to this contribution, the author believes. For optimum development, the watershed lands—forests and upland watershed areas—must be managed to yield their maximum in water supply. (In the western states, 20 percent of the surface area originates 80 percent of the water yield.) Such management has not occurred to date, and the author, in Section II, spares no interests, private or governmental, in analyzing the abuses of farm, grazing, timber, and wild lands west of the 98th meridian, and proposes sound measures for their correction. This reviewer feels that the author has perhaps been too conservative in his appraisal of the future need for these western lands and water, but agrees that the maximum contribution will result mainly from conservation, storage, and transportation of the present water resources rather than increasing that supply significantly through cloud nucleation—"seeding" of clouds from airplanes—and related methods. Appreciable precipitation, the author observes, usually results from contact of two air masses over some period of time, not by a change occurring within one air mass.

In Section III the author analyzes certain aspects of our western land policy and indicates the need for a unified policy of agricultural resource conservation. To help accomplish this, he recommends establishment of an Agricultural Conservation Planning Board in the United States Department of Agriculture. Reclamation, taxation, and conservation, the author argues, are the primary facets of western land policy.

Section IV discusses the public lands, pointing out the great acreages involved and emphasizing that the greatest values of much of these lands, particularly the national forest areas and the wild lands, are for watershed purposes. In the administration of the national forests, the author contends that "one faces a philosophical dilemma in trying to apply the laws of private property and contract to the private-enterprise uses in a public-enterprise program, created to function under an administrative agency and primarily in the general public interest." At the same time he acknowledges that we must find ways to improve our procedures for handling the conservation and uses of the national forests. The appraisal of the public domain lands and of the Taylor Grazing Act and its administration appears to be a very fair and helpful one.

The remaining sections of the book discuss livestock grazing and land tenure problems, reclamation, state and federal forestry programs, flood control and drainage programs and policies, and alternatives in river-basin development. In the concluding section, the author designates four specific lines of action to carry out desirable land and water-use policies: (1) educational work, (2) public-private cooperation, (3) administrative action, and (4) regulative action.

Although the book is limited to an analysis of western land and water use problems and policies, it advances certain basic principles for sound land and water management that are applicable to areas other than the western states. It should be useful as a supplemental reference in land economics courses, and in range management and livestock production courses. It should be read by all citizens—federal, state, and local governmental employees; ranchers, farmers, sportsmen, and others concerned with proper management and wise use of our western land and water resources.

ROLAND R. RENNE

*Montana State College*

*The Western Range Livestock Industry*, Marion Clawson. New York: McGraw-Hill Book Co., 1950. Pp. xiii, 401. \$5.00.

This book presents a large number of facts about the western range livestock industry. Reviewing nearly all the major studies of land and livestock of the western range region made in the last 25 years or more, it contains generalizations about production and marketing problems in the industry.

The author begins with a discussion of the place of range livestock in the national economy. He proceeds to describe the geographic divisions of the range region, the climate, plant cover, and other natural factors. The next six chapters present the general economic structure of the range region including land ownership, administration of federal range land, livestock numbers and production rates, economic utilization of feed and forage, range livestock fattening and marketing. Following this are seven chapters discussing the general characteristics of ranches, ranch organization and management, ranch valuation, land valuation and grazing fees, and credit institutions. The last eight chapters review information on meat consumption, meat prices, aggregate national expenditure on meat, market competition among meats, wool supplies and distribution, factors affecting the supply of meat, recent trends and prospects in the range livestock industry. Frequent notes are made on the literature of the field and convenient lists of references are presented.

The author states that the book is designed to serve primarily as a college textbook and reference, best adapted for students in upper divisions majoring in range management, agricultural economics, or animal husbandry. The hope is expressed that it also will be used by professional colleagues and the general public, especially ranchers. This objective of meeting the requirements of such a varied group presents a difficult assignment.

Certain chapters, such as those on cattle and sheep ranches, provide pertinent information on the economic organization of the industry. The surveys of climate and vegetation present background on the ecology of the region. Basic economic facts are contained in the chapter on land ownership. The discussions on administration of federal range lands and on grazing land values and grazing fees present an introduction to some of the important problems and issues in public administration of range lands. The book contains numerous conclusions of practical value. Many of these

are the direct results of research conducted by the author. Additional research remains to be done on several topics discussed, especially the following: (1) finding solutions to the conflict of the rancher and the government in administration of public lands, (2) discovering how best to adapt ranch size and type to the peculiar risk characteristics associated with variations in prices and feed supplies, (3) determining optima utilization patterns for various land combinations used by ranches, and (4) developing tax systems and land tenure patterns best adapted to the range country.

The chief criticism of the book, which is directed especially to its use as a classroom text, is that it generally does not present an analytical technique that can be applied toward the solution of problems. Theoretical concepts are sometimes treated in a vague and confusing manner. The large amount of statistical material is difficult to digest and there seems reasonable doubt as to its relevance for classroom use. The writing is sometimes repetitious and axiomatic. The sequence of discussion is difficult to follow since closely related topics, although cross referenced, are discussed at widely separated points.

More than the usual amount of discrimination would be required to adapt the text for classroom use. In spite of this, the book will be a valuable reference, perhaps an essential one, for students of the western range economy.

HAROLD G. HALCROW

*University of Connecticut*

*Agricultural Progress in the Cotton Belt Since 1920*, John Leonard Fulmer. Chapel Hill: The University of North Carolina Press, 1950. Pp. xiv, 236. \$3.50.

The author is a member of the faculty of the School of Rural Social Economics, University of Virginia. This book brings together materials which the author has developed over a period of time for class and research uses. His interest for many years has been in the economics of southern agriculture and the relation of agriculture to the total economy, particularly as found in the South. The book is based largely on an analysis and synthesis of data drawn from Census Reports and releases of the Bureau of Agricultural Economics.

The "Contents" show a "Preface," and nine chapters. Also there



are 21 tables of data in the "Statistical Appendix," and a very well developed "Selected Bibliography" of "Articles and Books," "Publications of Southern Agricultural Experiment Stations," "Government Publications," and "Sources of Statistical Data."

The first three chapters—Trends in the Cotton Belt; Regional Trends; and Farm Organizational Changes—deal with basic trends for the 10 Cotton Belt states as an area, then by regions within this area, and finally as averages per farm. The next two chapters—Mechanization; and The Mechanical Harvesting of Cotton—analyze the shifts to tractors and tractor-drawn equipment generally, and specifically to the use of mechanization in harvesting cotton.

Up to this point the analysis is basically with agriculture. The author uses 10 Cotton Belt states as the unit. Trends are developed for acreage, yield and production of crops, livestock numbers and production, farm practices, mechanical power, population, and gross income and cash receipts. The next step analyzes essentially the same items according to three regions within the 10-state area. These are designated Eastern, Delta, and Oklahoma-Texas. About the same items are considered then in terms of averages per farm to approximate farm organization situations.

The mechanization analysis goes into trends in labor requirements pertinent to the increased use of tractors and tractor-drawn equipment, and brings out the effect on non-cotton farms and, with other technology, on tenancy. This general treatment of mechanization is followed then by a more specific application to cotton harvesting. In this the author traces the development from the first use of the cotton strippers to modern cotton pickers. Main emphasis is on the reduction in labor requirement and the ultimate effect on farm organization and tenure.

At Chapter VI, Urbanization and Agriculture, the author shifts the emphasis to non-farm trends, and traces urban population growth for the area and regions, and changes in the occupational composition of the non-farm group. This serves to bridge the gap for farm, rural non-farm, and urban population. The concluding analysis describes the impact of urbanization on agriculture, with particular reference to the possible effects of migration upon the population remaining in agriculture.

Chapter VII, Other Dynamic Factors Influencing Southern

Agriculture, points out major items of significance in bringing about change, or those that thrive as a result of change. The analysis is largely by regions within the Cotton Belt. These include the changes in cotton farms versus other farms, trends in cotton acreage harvested and bales produced, adjustments in number of cotton farms to total farm population and to numbers of workstock, and the effects of soil conservation practices on land use.

The order seems quite logical when the author brings the analysis to a close with Chapter VIII, Income Shifts. Both farm income and total income are analyzed by regions, the area, and contrasted with the other 38 states. Attention is given to physical volume of production per worker as well as gross income in measuring the changes.

In Chapter XI, Summary and Conclusions, the author does an excellent job of restating the main factors considered in the analysis. These are presented as 10 specific items with a brief summary of the most pertinent consequences coming from each. Of perhaps most interest to the reader will be the five "considerations pertinent to further agricultural progress in the Cotton Belt." These are presented here as given by the author: (1) A cotton program of about twenty million acres but with a considerable flexibility permitted in regional adjustments in the enterprise. (2) Inducements to the agriculturally trained and capable young men to enter agriculture. (3) A farm labor program. (4) Formulation of a national land use policy for the Cotton Belt. (5) Discovery of a method by which the more important, practical, and simple research findings of the experiment stations and other research workers can be quickly applied by the mass of farmers.

The book contains much usable material. It should serve a very valuable place for reference purposes, especially in the area to which it applies. It is well written, but is difficult reading at times because of the large amount of statistical material. Also there are places when the reader may find the percentages confusing because of the shift in base period from which they were calculated. On the whole, it should be well received as a source book that brings together a large amount of statistical material into a readily usable form.

R. J. SAVILLE

*Mississippi State College*

*How To Make Your Farm Pay*, Carl C. Malone. Ames: Iowa State College Press, 1950. Pp. xi, 371. \$3.75, cloth; \$2.50, leatherette.

"The farmer wants his facts reasonably simple," observes Farm Management Specialist Carl C. Malone on page 301 of his new book. And consistently, *How To Make Your Farm Pay* is written in an uncomplicated style for "... farmers and those who help them with their management problems" (p. v).

This book might be titled *How To Make Your "Midwest" Farm Pay*. Its illustrations and details on farm organization and operation are essentially limited to the midwest—the North Central States. In a sense, this geographical limitation is one of the book's strong points. Since specific physical and economic resource patterns are segregated, definite crop rotations and livestock programs can be discussed and compared. The author picks his audience—the farm people in an area he knows thoroughly—and pin points his material for them.

Among the book's thirteen chapters, four appeal to this reviewer as being packed with money-making principles, guides, rules of thumb, and check lists. Singled out first is Chapter III, Money Making—The Management Problem. The principles of effective use of management, labor, land, and working capital are spelled out, then demonstrated in well-chosen examples. The principles of diminishing returns and of marginality are brought home to the reader without mentioning the terms. Even so, many readers may be left a bit cold as to how to get the answers called for by the principles.

The other three chapters deserving special recognition—Chapters VI, VII, and VIII—deal with planning and operating cropping and livestock programs. Chapter VI discusses the economics of commercial fertilizer and manure, differences in soil fertility, and comparative returns from different midwest crops through comparisons of rotations and field layout. The technique of comparing rotations on the basis of total feed units produced per 100 acres is worthy of further study as more long-time yield data become available.

Chapter VII stresses the economics of different classes of livestock starting with geographic distribution and proceeding to enterprise requirements and adaptations. Dual purpose cattle receive continued discussion throughout the book, suggesting that

the author sees, more than many others, a significant place for this class of livestock in the midwest economy.

Livestock enterprise management details occupy Chapter VIII. Recent input-output data on individual classes of livestock fed on different systems or to different weights are well presented. Suggestions become very specific at points as "When the two-litter system (of hog production) is used, there is a big advantage in having the gilts farrow their first litter in the fall . . ." (p. 225).

Other farm organization and operation chapters discuss who should farm, where one should farm, choosing the type and size of farm, and putting the farm plan together. The last four chapters are devoted to marketing and seasonal price variation, farm records and business analysis, public and private institutions (government farm programs, credit agencies, professional farm managers, etc.), and successful living. Malone's Chapter XIII, *Around the Family Table*, is obviously written by a keen, sympathetic observer who lives, works with, and understands farm people and merits their confidence. It goes beyond farm management to family and life management, recognizing that the goal of the farm family is maximum total satisfaction to the group as a whole.

The 74 tables presented are generally simplified and the text is lightened by 78 figures, many of them well-chosen photographs. Though the author employs many rules of thumb, he cautions against their use. He frequently establishes his point by describing what a good farmer is doing, then giving this his blessing and stating why. This is an excellent teaching technique, but with it must go considerable research and teaching experience, to pick the proper examples.

Some would like further elaboration of certain points as farm buildings, machinery selection, and the economics of certain soil conservation practices. But within the book are the essential tools for planning and budgeting a profitable midwestern farm business. The book is not intended to be a college text. It isn't. But high school, vocational classes, and adults—either individually or in study groups—could well afford to read it. For college farm management classes, too, this book is a valuable reference.

LOWELL S. HARDIN

*Purdue University*

*Economics with Application to Agriculture*, E. F. Dummeier, R. B. Heflebower, and Theodore Norman. New York: McGraw-Hill, Third Edition, 1950, Pp. xi, 718. \$4.50.

The first edition of this well-known text came out in 1934 and was followed in 1940 by a more comprehensive and notably bulkier revision. Changes in the economy during the past decade provide ample reason for this, the third, edition. The preface explains that the revision represents the joint thought of both Dr. Heflebower and Dr. Norman but that the latter executed the plans. (Dr. Dummeier, it will be remembered, died a few years ago.)

The book is largely a combination of economic principles, illustrated with farm situations, and discussions of special agricultural topics. The outline of this edition is almost identical with that of its predecessor. Such mainstays of elementary economics textbooks as diminishing returns, comparative advantages, market price determination, and distribution of income to the factors of production are included here. So also are explanations of the theory of the firm under pure competition, monopolistic competition, and monopoly. These topics occupy about one-third of the book. Other subjects include farm organization, marketing, international trade, taxation, transportation, credit, land utilization, farm price programs, the price level, the business cycle, a little economic history, and an appraisal of capitalism. Not all topics are covered with equal thoroughness; farm management and marketing are given relatively little space because the authors assume that students probably will take specialized courses in those subjects; and cooperation is only briefly mentioned in connection with marketing, credit, and price control.

The revision consists principally of bringing the statistical information forward to the post-war period (usually through 1947) and of describing recent developments in such fields as international trade, general economic controls, and farm price policy (the Agricultural Act of 1949 is mentioned briefly). Where much new material of this sort has been added, the earlier discussion has been partly rewritten to condense it and to give it better proportion. Although other alterations are numerous, rarely has the approach to a topic been changed. Keynes gets slightly more attention than before; the principal concession to Keynes has been to delete all references to J. B. Say.

As might be expected in a book of this scope, there are some

points about which one might quibble with the authors. In listing the causes of changes in demand, for example, they name real income but not dollar income; and equilibrium in an industry characterized by monopolistic competition is attained solely by shifts of firms' cost curves as selling costs are varied to meet competition. Despite a few instances of this sort, the book is a competent description, at an elementary level, of conventional economic thought. The writing is as easy for students to read as it reasonably can be, and none of the subjects is pretentiously discussed.

This is an excellent textbook for an elementary course in agricultural economics if the purpose is to expose the student to orthodox thought in all subjects relating to this broad field. Even if it is not the purpose to cover so much ground, chapters can be selected to cover a more limited area very acceptably.

It happens, however, that the reviewer is not happy about the usual content of the introductory courses in economics or agricultural economics. Suppose we said to ourselves, "Here are students who know very little about the economy in which they live. Most of them will not study much more economics. What can we teach them in one or two semesters to prepare them as well as possible to deal with economic problems they will face later as producers, as consumers, and as citizens?" Would we devote any time to drawing marginal revenue curves for monopolists? Would we be as preoccupied as we now seem to be with forcing modern economic life into the conceptual framework and highly special terminology of Ricardo and Marshall? In general, would we interpose so much formalism between the student and ideas?

It may be unfair to criticize, at least by implication, a book as good as this for not doing something that no other text has done well. But this book represents conventional instruction in introductory economics and agricultural economics, and more effective ways of doing the job need to be found.

G. E. BRANDOW

*The Pennsylvania State College*

*The Socialized Agriculture of the USSR*, Naum Jasny. Stanford: Stanford University Press, 1949. Pp. xv, 798. \$7.50.

Jasny has performed a very useful service by publishing this book. Its value as a source of facts for specialists in Soviet agriculture



is unquestionably great and all research workers will want to have it at hand for reference purposes. This volume is packed with quantitative data and descriptive material covering mainly the 1928-1938 period, with a brief analysis of Russian agricultural problems before the revolution, prior to collectivization and during the recent war.

The major objective of this book is to analyze the development of Soviet agriculture and its relation to the whole economy. It takes 800 pages to tell the story. In brief, what Jasny meant to say in these pages is that Communists used collectivization as an instrument in abolishing "monopolistic profit" which they had abolished in industry, but which persisted in agriculture in 1928. The sudden and crushing impact of collectivization threw out of gear the prevailing relationship between marginal cost, marginal revenue, and average revenue curves. In a matter of a few days peasants' "monopolistic profit" was eliminated, but the new investments which under the old competitive system were available to the producers ceased to flow to agriculture and the Government was not able to supply the needed funds required for normal production. This created low efficiency in the use of productive factors, a general curtailment of agricultural output, and increased cost in production. This Jasny calls "disinvestment." Presence of this "disinvestment" in 1928-1932 was a result of bitter resistance of the peasants to collectivization. They destroyed their buildings, equipment, and most of all livestock, especially horses; and according to Jasny this "disinvestment" was made good only in 1938, but most of the new investments were non-recurring, which did not help the situation much.

It was because of this bitterness and resistance on the part of the peasantry that labor productivity on the collective farm, in spite of new investment in mechanization, increased only slightly on a man-year basis and probably none at all on a man-hour basis. To prove this point, Jasny, not trusting official Soviet statistics, created his own index of physical output for 1928-1938 to which he applied 1926-1927 prices as constant. To do so he takes official data for various crops and reduces them by about 20 percent to allow for a change from official "biological" yield to "barnyard" yield. Under these assumptions he finds that gross farm output increased from 15.5 billion rubles (1926-1927 prices) in 1928 to 17.4 billion rubles in 1938. This does not represent increase in the

standard of living of the peasants, for Jasny points out that much of it was in "technical" crops such as sugar beets, fibers, etc., and also appears because of enlarged total population. Thus, he concludes that purchasing power of collectivized peasants during 1928-1938 period did not increase at all, which to him indicates a failure of the collectivized system.

Jasny tells us that if the U.S.S.R. is to improve the standard of living of its peasants, which even in 1930 represented 55 percent of the total labor force, the Soviet Union must expand industrial production. This requires an additional labor force which in turn cuts into the ranks of farm labor and therefore reduces agricultural output. In keeping technological advances static, Jasny feels that the Soviet Union thus is doomed to starvation, and he concludes his analysis by advancing the idea that a slight maladjustment in agricultural production will inevitably upset the whole Soviet economy. This hypothesis is very important to Jasny for he finds that during the whole span of collectivization (1928-1938 period), farm labor has declined by 10 percent (p. 714) and if a mass farm-to-city migration is not regulated by the Soviets, it may result in a collapse of the Soviet regime. This he sums up by saying: "The success of . . . reconstruction drive (after the war) will depend to a large extent on the results of the reconstruction of agriculture. Should the agricultural foundation fail, the industrial superstructure, however sturdy in itself, will fall with it" (p. 5).

The results of collectivization which Jasny describes undoubtedly indicate a weakness in the Soviet armour. However, his interpretation must be taken with reservations. Unlike Jasny, I feel that the collectivization program in 1938 was not at all completed and was still in the process of further adjustments. Throughout the whole period of collectivization—before, during, and after the war—the policy of the Soviets toward agriculture certainly was elastic enough to cope with new problems arising from the very nature of collectivization and calling for alteration of old policies and practices. If the collective system were as weak as Jasny describes, then certainly during the war the peasants had an excellent opportunity to revolt against their masters. The economic progress and stability of a nation like Russia, rich as it is in natural resources compared with present utilization, cannot be solely measured in terms of the peasants' standard of living. They must be measured in

terms of output of the basic industries; and even Jasny admits that the rate of increase of output for heavy industries was remarkable.

V. KATKOFF

*Ohio State University*

*The New World of Southeast Asia*, Lennox A. Mills and Associates, Minneapolis: University of Minnesota Press, 1949. Pp. vii. 445. \$5.00.

The first comment to make on this volume is that it should be considered a worthwhile function to present in one book information about a region little known here, though such data from other parts of the world are reasonably common currency in the United States. To the average intelligent American, beyond Iran, Asia is conceived in terms of India, China, Japan and an entity known as "Southeast Asia." Any book designed to give definition and light and shade to our view of the last-named must be greeted with thanks for its conception, given reasonably decent execution. On both scores, we must be grateful for the Mills volume.

The book appears to be notably deficient in what I had expected to be one of its primary functions—to elicit the interest of the reader in the area and to stimulate him to further reading. Although I am informed by one of the authors that this was not an explicit function, I still felt it a pity that it remains rather a high-grade "Inside . . ." book and an elaborated Statesman's Yearbook.

Given the conception that it was intended rather as a ready reference volume for the reader who might wish to brush up on two or more of the countries covered, it fulfills the objective admirably, with remarkable accuracy and grace in view of the difficulties of compiling a work by eight different authors. There remains, however, a problem as to how many such readers there are, especially how many economists.

The more particularized Southeast Asian references are largely devoted to the problems of rubber and tin, with passing reference to sugar. These commodities do not dominate the life of most of the countries of the area. It is suggested that Southeast Asia is deficient in food supplies. This is not significantly true of the area as a whole; with the marked exception of Malaya, all the countries are either very close to self-sufficiency or surplus in food. To be sure, the problem of increasing food production is an extremely

important one, but in the discussion the references are to mechanization and cultivation of new lands. Of at least equal importance are such factors as better water control, use of improved seed strains, and possibly increased employment of fertilizers.

In the relatively long discussion of rubber I believe the conclusions might be less pessimistic if there had been consideration of still active trend influences—for instance, the world is traveling more and more on rubber-tired wheels—and some discussion of the vitality of small scale native production. (The bibliography at the end of the chapter is incomplete without reference to the writings on rubber of P. T. Bauer.) Incidentally, I doubt that natural rubber has on the average been of lower cost than synthetic since the end of the war (page 361); the “American manufacturers” of synthetic rubber referred to on page 361 continue to be, with minor exceptions, the United States Government.

Besides the designation of industrialization as a possible ameliorative for many of the economic and social ills of Southeast Asia, I believe that at least passing reference should have been made also to the political, or at least generally non-economic factors, entailed in any such present or future movement. This might have been done in connection with the problem of “sparing” laborers from agriculture to the possibilities of so-called “cottage industry.”

It is unfortunate that despite the references to the economic position of each country, the summary chapter on “Southeast Asia in World Economics” is somewhat diffuse. I am inclined to believe that it could have been more directly written on the problems of Southeast Asia. It is not, and, in view of the nature of the book, should not have been on a severe analytical level. Given this limitation, I believe the author was overly modest in relying upon what had been written in earlier chapters. It would have been useful to have gone more deeply into the non-rational considerations affecting many so-called economic decisions in Southeast Asia,—particularly those wrapped up in the term “nationalism.”

CHARLES J. SHOHAN

*Department of State*

*International Wheat Agreements, International Journal of Agrarian Affairs*, Vol. 1, No. 3. London: Oxford University Press, September, 1949. Pp. 127. 90¢.

At a time when the world is solemnly pondering the issues of

insuring full employment and of instituting international negotiation on trade policies as substitutes for a complete relapse into nationalistic trade hermitage, this issue of the *International Journal of Agrarian Affairs* devoted to *International Wheat Agreements* is indeed appropriate. Especially is this discussion significant for agricultural economists of the United States in light of the ratification of the International Wheat Agreement by the Senate and of the pending decision concerning this country's membership in the ITO.

*International Wheat Agreements* is composed of three main sections. First, the editor presents a short summary giving the historical high lights and controversial issues in the wheat agreement attempts since 1931.

The second and major portion of the publication is devoted to a symposium of five contributors from different countries analyzing the pros and cons of the agreement. The last section of the journal is devoted to the texts of the final act of the 1933 wheat conference, of the memorandum and draft convention for the 1942 meeting, and of the agreements which were developed in both the 1948 and 1949 conferences. This section serves mainly as a document for reference.

Dr. A. C. B. Maiden of the Bureau of Agricultural Economics, Canberra, Australia, gives the lead-off statement. Dr. Maiden finds for the interested parties a common ground for agreement in the pact's objective "to assure supplies of wheat to importing countries and to assure markets to exporting countries at equitable and stable prices." Reference is made to the following trade objectives set forth in an early FAO commission proposal: any commodity arrangement should be multilateral in nature, should contribute to the stabilization of agricultural prices at levels fair to both producers and consumers, should stress expansion of consumption instead of restricted production, and should encourage production in areas with greatest advantage for efficiency. Dr. Maiden examines the wheat agreement in light of these criteria concluding with a rather favorable appraisal.

Giuseppe Orlando of the National Institute of Agricultural Economics, Rome, next comments as a representative of a significant producing, yet importing, country. Dr. Orlando's scholarly thesis retraces the tragic steps taken by his country during the 20's and 30's as it shut out world competition with prohibitive

restrictions and then experienced expanded high cost production and high consumer prices. The author sees the wheat agreement as an aid in facilitating needed internal production adjustments in Italy and as a preventive remedy against recurring depressions. D. Orlando sums up his argument: "... the wheat agreement—first of a series of agreements regarding essential products which should function as regulating pivots of the cyclical fluctuations—is not only advantageous for the contracting parties, exporters and importers alike, but represents above all a first tentative experiment towards the realization of that plan for an increase of world income and a full employment of the productive factors as set forth in Keynes's theory" (p. 38).

The third participant, Jorgen Pedersen, a professor of economics at the University of Arhus, Denmark, also represents an importing country. He takes a rather dim view of the international wheat agreement, disagreeing strongly with the position that agricultural commodities exhibit rather inelastic supply and demand and citing some of his own studies covering the "equilibrium" period 1855 to 1913. Professor Pedersen's argument is summed up in a concluding comment: "The limitation of price fluctuations in general and the acceleration of the processes of adaptation are no doubt highly desirable ends, but these objects could not be attained by measures which in their effect run counter to the self-regulating forces of the economic system instead of supporting them" (p. 50).

Dr. Clare Burgess, Director, Carr's Flour Mills, Carlisle, England, gives a businessman's backing to Professor Pedersen's position. His opening comments set the tone of his thesis. "War conditions made controls and planning inevitable and it seems to be equally inevitable that controls and plans lead to super controls and super plans. . . . Under such conditions incipient planners develop like hot-house plants, and there grows up a body of experts who, under more normal conditions, might have been born to blush unseen" (pp. 51, 52). He finds the wheat agreement coercive on the importers and not likely to endure anyway since all parties of a lasting pact must have equal advantage. Dr. Burgess closes his statement by questioning the appropriateness of the floundering, non-objective international conference as an approach to trade matters.

The last spokesman representing another exporting nation is H. G. L. Strange, Director, Research Department, Searle Grain Co., Ltd., Winnipeg, Canada. The stage is set for this somewhat



less analytical note by his brief review of innumerable historic attempts at setting the price of wheat, all of which have utterly failed because due credit was not accorded the "unseen hand" of the economic world. Furthermore, such agreements are quite undemocratic since they "are arrived at by a group of people of one type of mind only; such agreements are never the result of free discussion" (p. 68). Certainly a world wheat council cannot predict supply and demand, for supply is governed mainly by weather and demand by the heartless buying of women. He ends with a plea for an expanded futures market as the only hope.

Though the editors should be complimented upon their choice of contributors for the issue, this reviewer believes that the publication could have been strengthened by an interpretation of the development of the ITO charter as it deals with these commodity agreements and the problem of production and prices of agricultural products. Then, if a contributor from one of the countries who was a party to the agreement, or better still, was outside the conference could more analytically work out the implication of the agreement to the entire world trade scene, a real addition would be made.

ROBERT G. F. SPITZE

*University of Wisconsin*

*The Invasion of New Zealand by People, Plants and Animals*, Andrew Hill Clark. New Brunswick: Rutgers University Press, 1949. Pp. xiv, 465. \$6.00.

This book about the South Island is described by its author as "a report on a revolutionary change in the character of a region . . . [accompanying] the invasion of the area by armies of plants and animals, which, with the help of man, mingled with or displaced the native flora and fauna." Such a study of "the complex multitude of elements associated in the area (the things of nature like soils and plants, rivers and mountains, climate and insects, together with man and his impedimenta of institutions, habits and prejudices)" is rightfully considered an appropriate one for a geographer to undertake.

Professor Clark has written a book which is of interest to agricultural economists by reason both of its content and its method. Something important has happened to geography and geographers during the past fifteen years. They no longer content themselves

with a description of the physical features of an area, its resources and a list of its principal products. As indicated above by the author's statement of his objective, this study is far more than that. It is a workmanlike job of ferreting out the various factors which combine to make up the agricultural economy of South Island and tracing their impact upon the historical development of settlement.

The book deals in turn with the land, the people, the invading animals and the invading plants. It is the story of an island with a splendid climate and poor soils which was by-passed by Europeans until the first visit in 1770 by Captain Cook.

A planned series of settlements was initiated by Britain in the 1840's, designed to transfer to the new country a cross-section of English rural life. During the course of the next fifty years the island was indeed occupied by the British, but largely, and contrary to the original plan, by "the urban poor." These immigrants brought their crops, their animals (both domestic and wild) and their trees with them. Their lack of agricultural experience Professor Hill considers an asset, since, although they had plenty to learn, they had little to unlearn.

Along with the story of the introduction and cultivation of cereals, roots, and forage crops, the author traces the development of technology—of better varieties and cultural practices, of improved machinery, and of the search for and discovery of means of providing water.

If a criticism may be made of this study, it is, perhaps, one which stems from the geographer's own success. He has provided the reader with an account of how the natural resources and the people of the area have contributed to the development of the present agricultural economy—but in so doing he has confined himself almost entirely to agriculture and he has paid a minimum of attention to the economic problems of that industry. Agriculture is an important part, but still only a part, of the economy of New Zealand. How has its development fitted in with that of other industries? What proportion of the gainfully occupied are in agriculture? What part of the national income does it contribute? What are the economic problems of agriculture, apart from those connected with the use of land? The author realizes that these issues are important; he inquires as to what might happen to the economy of New Zealand if the standard of living in her most important market, Britain, should materially decline; or if the prices of wool, butterfat, and mutton should fall to low levels.

Perhaps it is up to the economist rather than the geographer to contribute this analysis. The author, by providing the reader with so much that is significant and helpful to an understanding of the New Zealand economy, encourages him to ask for more.

Professor Clark, a Canadian from birth to the receipt of his master's degree, has promised a similar study of Canada's Maritime Provinces. We await it eagerly and venture to predict that any account of the genesis and development of land use in these provinces must concern itself very largely with economics.

GORDON L. BURTON

*Macdonald College,  
McGill University*

*Horace Plunkett: An Anglo-American Irishman*, Margaret Digby. Oxford: Basil Blackwell, 1949. (Distributed by the Macmillan Company, New York.) Pp. xviii, 314. \$3.00.

This authoritative biography of Horace Plunkett will be of interest to agricultural economists who are working in the field of agricultural cooperation and agricultural policy, for few persons—if any—have exerted a greater influence in these fields than Sir Horace Plunkett.

The facts of Plunkett's life can be briefly stated. Born in Ireland in 1854, trained at Eton and Oxford, he spent a large portion of the years from 1879 to 1889 in Wyoming as a cattle rancher. This experience and continuing business interests established a bond with the United States that was never broken. Upon his return to Ireland in 1889, just as the great land reform movement was getting under way, Plunkett conceived that the basic economic problems of Ireland could be solved only through rural rehabilitation via cooperative organization to strengthen the character of the people and assure them of the economic benefits of progress.

In this book Margaret Digby, Secretary of the Horace Plunkett Foundation, skilfully tells how Plunkett fashioned the Irish agricultural cooperative movement with a group of devoted followers, tied together in the Agricultural Organization Society. Within a dozen years the fruits of Plunkett's work were apparent and Ireland had become a demonstration of what could be done through cooperation—and also how it could best be done—with the Government supporting voluntary efforts.

While this great economic and social enterprise was under way Plunkett began to exert a deep influence on American agricultural

thought. This volume shows how he gave to Roosevelt his "3 betters" slogan, "Better Farming, Better Business, Better Living," and fired his enthusiasm for rural reform until President Roosevelt created the famous Rural Life Commission in 1908. It is of interest here that one of President Roosevelt's last official acts was to write a letter to the British Ambassador, James Bryce, to record officially his appreciation of Plunkett's great service.

Plunkett's interest in the American rural life problem continued with his book, *The Rural Life Problem in America*, published in 1910, urging the establishment of a research and educational center for farmers' cooperative associations. The creation in the Department of Agriculture of the Office of Markets and of the Office of Rural Organization in 1913 was to a considerable extent an outgrowth of Plunkett's thinking. In 1917 the National Agricultural Organization Society was launched with a grant of \$20,000 from the Carnegie Trust. Although the war curtailed the effectiveness of this organization, its influence came to fruition several years later in the establishment of the American Institute of Cooperation and the National Council for Farmer Cooperatives.

In his later years Plunkett gave his energies to the development of cooperatives in all parts of the world. In 1919 he conceived the idea of an international center for the promotion of agricultural cooperation, the present Horace Plunkett Foundation which he endowed with the bulk of his life's savings.

In all of his work with cooperatives Plunkett stood for self-help, free from government domination. He believed the role of government should be to provide the proper conditions for cooperative development through the spread of technical and general knowledge.

This brief review cannot touch on the broader phases of Plunkett's life, especially his role as a diplomatic go-between on Anglo-American problems in the First World War and his unremitting efforts to ameliorate the delicate Irish problem. However, to understand and fully appreciate the importance of Plunkett's work we must see him in his whole environment. This is one of the major contributions of Miss Digby's book.

This volume will repay the attention of anyone who is interested in seeing how a man of blunt honesty, reckless courage, driving energy, and incisive intellect, was able to mold the institutions of rural environment in practically all parts of the world.

This book has a message in this day of FAO and Point 4 programs for helping undeveloped countries, for it shows how rural people can be organized to help themselves in improving their economic and social conditions.

The value of this volume is enhanced by an introductory essay by Dr. W. G. S. Adams, a co-worker and life-time friend, and by an epilogue written by Gerald Heard, who was privileged to serve Plunkett as "A.D.C.", rather than Secretary, for many years.

JOSEPH G. KNAPP

*Farm Credit Administration*

*Garantia de Precos Estaveis e Remuneradores a Agricultura de Sao Paulo.* Rui, Miller Paiva. Sao Paulo, Brazil, Secretaria da Agricultura: January, 1949. Processed. Pp. 79.

American agricultural economists familiar with Brazil probably would agree that the Division of Rural Economics of the State Department of Agriculture of Sao Paulo is, both actually and potentially, the best center of agricultural economic research in Brazil. Very inadequately financed (it has only six to eight professional workers), it owes most of its promise and vitality to its able director, Sr. Paiva. Hence, students of Brazil always await the publications of his division with a great deal of interest and anticipation.

The present publication combines Studies in Rural Economics Nos. 5 and 6, the first entitled "General Principles of Guaranteed Prices for Agricultural Products"; the second, "Stable and Remunerative Prices for Cotton and Cereals." The first part (pp. 1-46) consists of an analysis of the general causes of unstable agricultural prices and low agricultural incomes, and a critical review of the various alternative techniques of guaranteeing agricultural prices—including price supports, production payments, production and marketing quotas, storage, surplus removal, and forward pricing. American readers will find that Paiva's discussion covers familiar ground in a thoroughly competent manner. Of greater interest will be the extent to which Sr. Paiva demonstrates his familiarity with the Anglo-American literature—in itself noteworthy because of the traditional dependence of Brazilian economists upon highly sterile French economic thought. Younger professional workers such as Paiva can do much to prevent Brazilian agricultural policy from repeating the mistakes of American experience.

In reviewing (pp. 5-7) Professor Schultz's analysis of the tendency for the supply of agricultural products to outrun the demand for them in the more advanced parts of the world, Paiva notes (p. 6) that such arguments appear strange to a Brazilian. Given Brazil's high rate of population growth and crude agricultural technology, its problem is still that of expanding domestic food production rather than the presence of an already excessive labor supply in agriculture. Nevertheless, "if there were fewer farmers in the world, the terms of trade of agricultural products in the international market would be high and consequently the remuneration of our farmers better." Later (p. 42) Paiva observes that "the major problem of Sao Paulo's agriculture" is the achievement of better farm practices and technology, which will permit farmers "to produce at lower cost and obtain larger income, without price increases."

In the second part of his study, Sr. Paiva turns specifically to cotton and cereals (rice, beans, corn). In cereals (but not cotton) he finds (pp. 48-51) unduly large variations in seasonal prices and geographic price differentials within the state of Sao Paulo, which he attributes to inadequate storage and handling facilities. He also considers the problem of guaranteeing prices which not only are stable but also remunerative. It would be against the public interest to attempt to raise cereal values by withholding part of the supply from the market (p. 63). In Sao Paulo, despite farmers' complaints about low cereal prices, to consumers they are relatively high, due to tariff protection and a highly inelastic domestic supply. Fundamentally, the solution lies in reducing the costs of cereal production and distribution so that present or lower price levels will become more remunerative (p. 67). If costs of production are to be decreased, improved farm practices and farm technology are essential. These can come only from a greatly expanded program of technical assistance and farm credit by the state.

Paiva next turns to the problem of lowering costs of cereal distribution. He puts little faith in existing private distributors, pointing out that they have failed to expand storage facilities despite a law of 1944 guaranteeing loans for this purpose (p. 72n.). He rejects producer cooperation, both because of the problems in its development and because consumer interests might be inadequately protected (p. 73). Because of its bureaucratic inefficiencies, a Government monopoly is also unwarranted. Paiva therefore proposes (pp.



73-77) a company of mixed capital (part public, part private) which would construct assembling and distributing warehouses, buy cereals in the country markets at guaranteed prices, and transport them to principal consuming centers, where they would be sold at prices sufficient to cover all necessary expenses. This company would also be responsible for stabilizing cereal prices by storage and would enjoy a monopoly of all exports from the state. Private middlemen would be restricted to country assembling or retail distributing operations. An expanded economic research organization would furnish the price and cost analyses and forecasts which the distributing company's operations would require (pp. 77-78).

Upon the basis of my own limited experience in Brazil, I believe that Sr. Paiva has clearly perceived the fundamental problems of Brazilian agriculture—its primitive technology and anachronistic farm practices; the tremendous need for adequate farm credit; the meager public resources devoted to support of agricultural research, extension and market services; and the disorganized marketing structure, characterized by extremely high distributing margins, important monopoly elements, and highly unsatisfactory transportation, storage and communication facilities. However, his proposed solutions are probably too ambitious for immediate adoption as a single overall program, such as he favors. Rather, it might be advisable to set up a series of priorities in the use of limited public funds. The highest priority should be given to a large-scale expansion of public agricultural services. Knowledge, and its widespread dissemination, do not come *gratis*—a lesson which most Brazilian public administrators have been slow to learn. As a result, they have too often favored spectacular but fly-by-night proposals to more commonplace but well-founded ones, such as men like Paiva could provide.

WILLIAM H. NICHOLLS

*Vanderbilt University*

*The Economics of Agriculture*, R. L. Cohen, London: Nisbet & Company, Ltd.; Cambridge: At the University Press, 1949, sixth impression revised. Pp. xvi, 216, 6 shillings net.

The main item of interest in this revised handbook is the discussion on state intervention contained in the concluding chapter. The preceding chapters contain only slight revisions in the text

of the previous printings. The author is to be commended for her success in stating in elementary language the basic economic problems to be found in the sphere of agricultural production and marketing. She is handicapped in this treatment, however, by her attempt to discuss agriculture under what she terms more or less static conditions and also without going into the field of farm management. The result resembles a restatement of economic principles somewhat more than it does a book on farm economics.

The last chapter, which is 48 pages in length, covers briefly the more common forms of governmental intervention. It is a disappointment not to find a discussion of state trading, or an analysis of the effects of trading by the British Ministry of Food. Another disappointment is her failure to discuss the relative merits of greater home output at high cost of farm products in the United Kingdom, rather than greater concentration of capital and labor on industrial production with a view to earning foreign exchange for the purchase of food abroad. These subjects she considers beyond the scope of the book, yet they may be as effective or more so, in their control of the agricultural economy as a whole than are some controls which are discussed, including import duties, quantitative restriction of imports, restriction of sales, and the planning of agricultural prices.

The author justifies the principle of intervention to stabilize farm prices but thinks there may be unwarranted increases in production or exploitation of consumers if the control is vested in responsible bodies representative of producers alone. Some schemes have been advertised as stabilization plans when in fact they tended to raise prices above the long-term normal under competitive conditions. Intervention, she declares, may be desirable provided it is designed and carried into effect in the interests of the community as a whole.

MONTELL OGDON

*Office of Foreign Agricultural Relations*

*Public Finance and National Income*, Harold M. Somers, Philadelphia: The Blakiston Company, 1949. Pp. xii, 540. \$5.00.

Mr. Somers and his publisher are to be congratulated for producing a text which does not highlight the traditional description of administrative procedure and the politically feasible—a discussion based largely upon current (and sometimes highly perishable)

practices in government and intuitive judgments, the basis for which is largely the faith of the reader in the author—and focuses instead upon analysis of fiscal activities described and evaluated in terms of their effects upon certain economic variables. While the analysis is not always consistent and is perhaps somewhat unbalanced by Mr. Somers' special interests, the book is one that may prove stimulating, particularly to those who are not specialists in public finance yet who are interested in the application of economic analysis to specific policy problems.

The heart of the analytical section of the book is devoted to describing the effects of government expenditures upon aggregate demand for goods and services (Part II) and to applying what Mr. Somers considers to be "modern price theory" (page 160) to analysis of the incidence and effects of taxation (Part III). Government borrowing, state and local finance, and fiscal policy and economic activity are each covered in a separate part of the book.

In analyzing the effects of government expenditure upon the level of economic activity, Mr. Somers conventionally splits private spending into two parts—consumer spending and business investment. His analysis of effects upon consumer expenditure is primarily the conventional static one, i.e., he is concerned with the consequences of a change in an exogenous variable (government expenditure) upon the equilibrium level of consumer expenditure. However, he attempts to trace the path of business investment through time, including an explanation of turning points. The dynamic theory underlying this part of the analysis is the acceleration principle. One might infer that this is one of Mr. Somers' "pets," for about 10 percent of the book is devoted to it. This includes an explanation of Hayek's theory, and a description and attempted refutation of Tinbergen's empirical rejection of the acceleration principle. Somers concludes that "the possibility of testing a *realistically formulated* acceleration principle is remote indeed" (page 116); that investment may lag, follow, or accompany rates of changes in consumption; and that the size of the *Accelerator* changes. One wonders if a concept which, because of the limitations mentioned above, appears relatively useless for purposes of either historical explanation or prediction, merits such extended discussion.

The variables in which the author appears to be interested in his application of "modern price theory" to analysis of the economic

effects of various kinds of taxes are (1) relative prices (this usual interest of the theory of tax shifting and incidence), (2) consumption and welfare, (3) production and enterprise, (4) employment and national income, (5) savings and capital formation, (6) distribution of income and (7) economic progress. The exact meaning of each category is not always clear. For example, one would expect that savings and capital formation are relevant because they affect economic progress, and that all of the other six classes are subsumed by welfare. Also, the analysis is not (and probably could not be, in 527 pages) complete enough to permit the reader to determine how Mr. Somers has founded all of his assertions.

Parts of the discussion are not too clear. For example, in the discussion to tax shifting, the implied set of relevant variables is relative prices. Yet the general level of prices also seems to creep in. (Note particularly the section on backward shifting of income taxes.) In some of the analyses of effects via cash balances, it is not clear whether the changes are on income account, asset account or both. Economic surplus is supposedly defined as an income element that could be taxed away without affecting the production pattern. Yet windfall profits, while considered as a surplus, are also mentioned as a lure to prospective business and hence not a surplus. Such points need not be confusing to a well-trained economist, but may trip the student. However, there are few books which are without at least a few errors.

O. H. BROWNLEE

*University of Chicago*

*Congress Makes a Law*, Stephen Kemp Bailey. New York: Columbia University Press, 1950. Pp. xii, 282. \$4.50.

This book is a story of the legislative history of the "Full Employment Bill," or the Employment Act of 1946, which set up the Council of Economic Advisors to the President. The objectives of the author may be gleaned from the following quotations:

"Whether the Employment Act of 1946 was a 'good thing,' or a 'bad thing,' is, in the context of this book, beside the point. The real question posed by the story of S.380 is what it suggests about the Congressional formulation of important social and economic policies in the middle of the twentieth century." (P. 236.)

"For most Americans the drama of Congressional policy making is played behind closed curtains." (P. vii.)

From these statements it is apparent that the chief objective of the author is to draw the strings of these closed curtains and thus acquaint readers with the intricacies of American Congressional legislation.

As a background for political and economic thinking leading up to the first formulation of the Full Employment Bill of 1945, the author reviews federal concern with "panic" and depression" periods. He gives particular weight to the economic and legislative experience of the "dismal" thirties as a necessary prerequisite to the birth of the original 1945 Bill.

The author specifically credits four groups with the role of middlemen serving to reflect the Keynesian theory in the Full Employment Bill. These were: the National Planning Association, the National Farmers Union, the Fiscal Division of the Budget Bureau, and the National Resources Planning Board. He credits Russell Smith, legislative representative of the National Farmers Union, with jotting down notes "for a broad employment program in which the Federal Government would underwrite the total national investment necessary to insure full employment," and with carrying through discussions with Louis Bean and Gerhard Colm of the Budget Bureau, Mordecai Ezekiel of the Bureau of Agricultural Economics, Alvin Hansen, Jim Patton, and others; discussions which led to revisions finally submitted as an amendment to the Kilgore Bill (introduced March 29, 1944 as S.1823, 78th Congress, 2nd Session) which provided for an Office of War Mobilization and Adjustment, with a National Production Employment Board and a Bureau of Programs to take care of long-range postwar planning. This amendment was sponsored by Senator Murray and finally became the basis for the full S.380 Bill.

Much of the book is concerned with strategical movements of proponents and opponents of the bill with respect to publicity, selection of witnesses, etc. The author gives particular credit to the work of staff member Bertram Gross in both publicity work and strategic planning. He cites the large number of "ghost" written speeches prepared by this staff, as well as questions and answers.

After reciting the procedure of the bill through the House, and the influence of the particular committee and committee members to which it was assigned, the author describes in detail personalities and proceedings involved in the Joint Conference Committee named to iron out Senate and House versions of the bill. He lists

as the six conservative members of the Joint Committee: Senators Buck, Radcliffe, and Taft; and Congressmen Hoffman, Manasco, and Whittington in order of their conservatism for their respective groups. As liberal members he lists in order of this quality: Senators Taylor, Barkley, Murdock, and Tobey; and Congressmen Cochran and Bender. He devotes a section to the background of each of these men in an attempt to explain their positions. In this he is not entirely consistent, since backgrounds of destitute beginnings are described as a springboard for both liberal and conservative views.

In turn, it might be pointed out that the author appears to have considerable carryover from earlier days of being taught at the University College, Oxford, by Lord Beveridge, and later by his writings. Frequent reference is made to Lord Beveridge's books, "The Pillars of Security" and "Full Employment in a Free Society."

Furthermore, at the outset the author very frankly states,

"My sympathies are 'a little left of center,' which means in terms of S.380 that my emotional bias was toward the sponsors rather than the opponents of the original bill. In making this study, however, I have tried, in so far as is humanly possible, to divorce head from heart." (P. xi.)

The author laments the elimination of the federal responsibility for full employment feature of the bill as finally enacted by the Congress. In his conclusion he states:

"In the absence of a widely recognized crisis, legislative policymaking tends to be fought out at the level of large irresponsible personal and group stratagems and compromises based upon temporary power coalitions of political administrative and non-governmental interests." (P. 235.)

When the reader takes into consideration the "human bias" that creeps into Mr. Bailey's appraisal of proponents and opponents of the bill, he is led to wonder if the above statement would have been made if the bill had fallen into the hands of a more favorable House Committee, especially if that Committee had had a Bertram Gross to head its staff. Certainly the author appears to applaud the political activities of the bill's proponents, and to attack its opponents as having selfish views or limited backgrounds.

Finally, the author expresses concern as to whether the American system can long endure *without a responsible political system which will reflect the will of the majority* and which will enable the citizens



to hold identifiable rulers accountable for policy decisions. However, he does not undertake to demonstrate that the actions of Congress are more irresponsible than large segments of the majority vote in national elections.

This book is a well-written, entertaining description of the evolutionary processes through which much of our national legislation goes. Five years of limited Washington experience lead to the opinion that the author's account of the various influences of individuals, groups, congressional committees, and individual members of the Congress on national legislation is an accurate portrayal. *Congress Makes a Law* should be recommended reading for students of political and social science.

WALTER P. COTTON

North Carolina State College

*The Dynamics of Business Cycles*, Jan Tinbergen. Translated from the Dutch and adapted for American use by J. J. Polak, Chicago: University of Chicago Press, 1950. Pp. x, 366. \$5.00.

It is an interesting fact that many of the most important contributions of modern economics have recently come from small European countries. The contributions of the Swedish school of economics are well known, and also the work of some Norwegian economists. Now we have another important treatise by the Dutch economist, Jan Tinbergen. Essentially a translation of his book, *Economische Bewegingsleer*, published in Amsterdam in 1942 (North Holland Publishing Company), it has been revised and made suitable for American readers.

During the 1930's there were many books and articles published on the subject of business cycles. Recently there has been a lack of important contributions in this field. Hence the publication of this thorough study of the theoretical and practical aspects of the business cycle is particularly welcome. Professor Tinbergen is well known as an outstanding economic theorist and statistician. His previous two volumes of statistical studies in this sphere (*Statistical Testing of Business Cycle Theories*, Geneva 1939) have established his reputation as a pioneer in the application of econometric methods to economic fluctuations. His articles on this subject were frequently published in various European journals and are not easily accessible to American economists. Hence it is very fortunate that we have this comprehensive survey of his ideas in his book.

Professor Tinbergen has for a long time been associated with the Dutch Central Statistical Office and the Dutch Planning Commission. He has had a very wide experience with the practical problems of economic policy related to the business cycle. He is also well acquainted with the economic policy of various European countries and the United States. Hence his practical recommendations carry great weight and ought to be given serious consideration by all economists who interest themselves in questions of practical policy.

Professor Tinbergen has made outstanding contributions to mathematical economics and to statistical methodology of questions related to the study of cycles. But the book is written for economists who are not trained in mathematics and the more complicated methods of statistics, hence it can be recommended to all who are interested in the subject regardless of training.

His point of view in business cycle theory and also in policy is eclectic. Although greatly influenced by Keynesian ideas, Professor Tinbergen also gives other systems consideration in his discussion.

The first part of the book deals with a simple but thorough discussion of types of movements of economic time series. He discusses long-run developments, sudden changes in structure, cyclical movements, seasonal fluctuations, and random movements. There are many illustrations from European and American data. The discussion of fluctuations in individual markets, especially of the hog cycle, ought to be of great interest to agricultural economists.

The second part of the book deals with the explanation of economic fluctuations. There is a discussion of the concepts of economic statics and dynamics, long run developments, war and inflation and long waves. A long chapter deals with business cycles proper and develops various models. There is finally a chapter of cyclical movements in individual markets. The discussion of the hog market, the coffee market, the cycle in agricultural products and cycles in the imports of raw materials should be of great importance to economists working in the agricultural field. Exogenous movements are discussed in a final chapter.

The last part of the book deals in a very thorough fashion with business cycle policy. There is first a discussion of the objectives of policy. Possible policies are divided into two groups, indirect and direct. Under the heading of indirect policies the author discusses: taxes, interest policy, credit policy, wage policy, price policy, meas-

ures related to the exchange rate and to the stock market. Direct policies deal with the following measures: expenditure policy, investment control, control of the production of raw materials, commercial policy, control of the construction industry. A final chapter is devoted to the choice of the optimum policy.

This book should make an excellent text for a somewhat advanced course on business cycles. It could be used on the senior undergraduate level and will make an excellent text for graduate students. American economists have reason to be grateful to Professor Tinbergen for his valuable contribution in this difficult field.

GERHARD TINTNER

*Iowa State College*

## PUBLICATIONS RECEIVED

- Adams, Walter, Ed., "The Structure of American Industry," New York: The Macmillan Company, 1950. Pp. x, 588. \$4.75.
- Allan, William, "Studies in African Land Usage in Northern Rhodesia," New York: Oxford University Press, 1949. Pp. 85. \$1.75.
- Ball, Joseph H., "Where Does Statism Begin?" No. 134 in *National Economic Problems Series*, New York: American Enterprise Association, 1950. Pp. 34.
- \*Bennett, M. K. and Associates, "International Commodity Stockpiling as an Economic Stabilizer," California: Stanford University Press, 1950. Pp. viii, 205. \$3.00.
- \*Clawson, Marion, "The Western Range Livestock Industry," New York: McGraw-Hill Book Company, 1950. Pp. xiii, 401. \$5.00.
- \*Davis, John H., "An Economic Analysis of the Tax Status of Farmer Cooperatives," Washington, D. C.: American Institute of Cooperation, 1950. Pp. viii, 128.
- Duggan, I. W. and Battles, Ralph U., "Financing the Farm Business," New York: John Wiley and Sons, 1950. Pp. viii, 354. \$4.00.
- \*Dummeier, Edwin F., Heflebower, Richard B., and Norman, Theodore, "Economics with Applications to Agriculture," New York: McGraw-Hill Book Company, 1950. Pp. xv, 718, new 3rd edition. \$5.00.
- Fulmer, John Leonard, "Agricultural Progress in the Cotton Belt since 1920," Chapel Hill: University of North Carolina Press, 1950. Pp. xiv, 236. \$3.50.
- Hewes, Laurence I., Jr., "Japanese Land Reform Program" Tokyo: Supreme Commander for the Allied Powers, Natural Resources Section, Report No. 127, 1950. Pp. 118.
- Hoffsommer, Harold, "The Social and Economic Significance of Land Tenure in the Southwestern States," Chapel Hill: University of North Carolina Press, 1950. Pp. ix, 666. \$6.00.
- \*Jasny, Naum, "The Socialized Agriculture of the U.S.S.R." Washington, D. C.: Stanford University Press, May, 1950. Pp. 798. \$7.50.
- Kapp, K. William, "The Social Costs of Private Enterprise," Cambridge: Harvard University Press, 1950. Pp. xii, 287. \$4.50.

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\* Publications reviewed in this issue.

- Klose, Nelson, "America's Crop Heritage," Ames: Iowa State College Press, 1950. Pp. viii, 156. \$3.50.
- Lee, Maurice W., "Tax Structure of the State of Washington," Pullman, Washington: State College of Washington Press, 1950. Pp. viii, 134. \$2.50.
- Loomis, Charles P. and Beegle, J. Allan, "Rural Social Systems," New York: Prentice Hall, Inc., 1950. Pp. xxvii, 873. \$6.75.
- Mund, Vernon A., "Government and Business," New York: Harper and Brothers, 1950. Pp. x, 659.
- Perloff, Harvey S., "Puerto Rico's Economic Future," Chicago: University of Chicago Press, 1950. Pp. xviii, 435. \$4.75.
- \*Saunderson, Mont H., "Western Land and Water Use," Norman, Oklahoma: University of Oklahoma Press, 1950. Pp. xi, 217. \$3.75.
- Sayana, V. V., "Sharing and Fixed Tenancy Systems," Madras, India: The Business Week Press, 1949. Pp. xi, 137. Sh. 5/-.
- \*Tinbergen, Jan, "The Dynamics of Business Cycles," Chicago: University of Chicago Press, 1950. Pp. x, 366. \$5.00.

## NEWS NOTES

Dr. George S. Abshier accepted an appointment as Assistant Professor of Agricultural Marketing at North Carolina State College in July. Dr. Abshier was formerly in charge of grain marketing research and extension work at Purdue University.

Glen T. Barton has completed the requirements for his Doctor's degree at Harvard University, and has returned to his work in the Division of Farm Management and Costs, Bureau of Agricultural Economics.

Lyle M. Bender, Extension Farm Management Specialist, South Dakota State College, will be on leave part of 1950-51 to attend Harvard University. He was awarded a Carnegie Extension Fellowship, and will be doing graduate work in Public Administration.

James W. Birkhead has resumed his work in the Division of Farm Management and Costs, Bureau of Agricultural Economics, after leave for graduate work at Harvard University.

John T. Buck, who has been a Research Assistant at the University of Minnesota, has accepted a position as Research Economist in the field of poultry marketing at Virginia Polytechnic Institute.

Dale E. Butz has been appointed Assistant Professor in Research in Agricultural Economics at Michigan State College effective July 1. Professor Butts is completing his doctorate at the University of Minnesota.

George B. Byers has been promoted from the position of Associate Economist to Economist in Farm Economics at the University of Kentucky.

The Canadian Agricultural Economics Society has these newly-elected officers: President, Hadley Van Vliet, University of Saskatchewan, and Vice-President, H. K. Leckie, Ontario Agricultural College.

G. Alvin Carpenter, who has been doing graduate work during the past year at Cornell University, will return to Utah State Agricultural College in August to assume his duties as County Agent Leader for the Extension Service.

Eugene H. Carter, Michigan State College, has accepted a position with the Michigan federal-state crop reporting service.

Emery Castle was granted a leave of absence from Kansas State College to do graduate work at Iowa State College.

Warren E. Deviney, recently on field work in South Carolina for the Division of Farm Management and Costs, Bureau of Agricultural Economics, is now a field supervisor with the Production and Marketing Administration at Birmingham, Ala.

R. J. Doll of Kansas State College taught a course in Agricultural Policy at the Southern Regional Training Program for Extension Workers, which was held at the University of Arkansas July 17-August 4.

Howard R. Dorsett, who has finished his residence work for advanced study at Iowa State College, has accepted a temporary assistant professorship at Kansas State College.

W. M. Drummond, who has been at Harvard University for the past year, has returned to the Ontario Agricultural College at Guelph.



Dr. A. W. Epp has been promoted from assistant professor to associate professor in charge of farm management teaching and research at the University of Nebraska.

Cora L. Feldkamp, a loyal member of the American Farm Management Association for a number of years, retired on May 31 from service in the Library of the United States Department of Agriculture.

Louis A. Fourt, research assistant in the Economics Department of the University of Chicago, has accepted an appointment as assistant professor at North Dakota Agricultural College beginning September 15, 1950. He will be engaged in teaching and research in the economics of marketing and consumption.

Burton L. French joined the staff of the University of Nebraska July 1 as Assistant Professor of Agricultural Economics. His duties include teaching and research in agricultural statistics and prices.

Paul Froelich, of the Bureau of Agricultural Economics, recently received a Superior Service Award "for developing more efficient procedures with respect to the preparation and printing arrangements of the 1949 edition of *Agricultural Statistics*."

Gordon Haase, Economics Division, Dominion Department of Agriculture, who was formerly stationed at Saskatoon, has been transferred to the headquarters staff in Ottawa and will be associated with research in land economics.

Rex Helfenstine, after completion of his work toward a Doctor's degree at the University of California, has joined the Bureau of Agricultural Economics. He is engaged in research work pertaining to the development of the Missouri Basin in the field of farm management and is stationed at North Dakota Agricultural College.

Peter L. Henderson, who for the last two years has been teaching Agricultural Economics at the University of Georgia in the place of Professor Waldo S. Rowan, will enter Cornell University Graduate School to continue his studies for a Doctor's degree.

Carroll V. Hess, who recently completed his work toward a Ph.D. degree at Iowa State College, returns to the staff of The Pennsylvania State College to teach and do research in the field of production economics.

Dr. John W. Hicks has accepted an appointment as Assistant Professor of Agricultural Economics at Purdue University, after having completed his studies toward a Ph.D. degree at Purdue in June.

Raymond A. Higgins has been appointed Assistant Professor in Agricultural Economics at Michigan State College. Mr. Higgins will work in the consumer education extension project.

Clifford Hildreth, Cowles Commission, University of Chicago, has been aiding personnel of the Farm Economics Department, University of Kentucky, in the development of an econometric model. It is being designed to aid in studying yields and prices resulting from operation of the burley production control and price support programs.

Conrado Hunter of Chile has joined the staff of the Bureau of Agricultural Economics for the summer, to work on world demand for United States agricultural products. Mr. Hunter is a student at McGill University, to which he will return in the fall.

Dr. V. L. Israelsen, on the staff of the Department of Agricultural Economics at Utah State Agricultural College, has been granted a year's leave beginning July 1 to accept a position with the Housing Administration.

R. W. Jones, of the Division of Farm Management and Costs, Bureau of Agricultural Economics, has been appointed Assistant Area Specialist for Belgium, the Netherlands, Luxembourg, Norway, Sweden, Denmark, China, and Korea, with the Economic Cooperation Administration, in May. The assignment involves analyses of the short- and long-term effects of requested food and agriculture expenditures upon the various aspects of the economy of this group of countries.

J. R. S. Jorgans of the University of Alberta has resigned his position as assistant professor and will join the staff of the Swift Canadian Company Limited in September.

M. M. Kelso, Head of the Departments of Rural Economics and Economics and Sociology at Montana State College, conducted a seminar on research methodology at Kansas State College June 8-June 14.

Donald C. Kimmel, who recently received his Ph.D. degree from The Pennsylvania State College, has accepted a position with the Florida Agricultural Experiment Station as an assistant professor. He will do research in the field of fruit and vegetable marketing.

Dr. Richard L. Kohls has accepted a position as assistant professor at Purdue University, after having obtained his Doctor's degree at Purdue in June.

Dr. Ellis W. Lamborn, of the Department of Agricultural Economics, Utah State Agricultural College, has been granted a leave for one year to accept a position with the Foundation for Economic Education in New York.

Gabriel Lundy, Agricultural Economics Department, South Dakota State College, has resigned as Head of the department for reasons of health, but will remain on the staff. Max Myers became head of the Department in July.

Arthur Mauch, Michigan State College, was one of a staff of three to accompany a "Flying Classroom" on a 45 day study tour of 11 European countries. The group of 65 was made up largely of primary and secondary school principals and superintendents and college personnel representing 41 states.

Kenneth P. Meinken has joined the staff of the Bureau of Agricultural Economics, where he is assigned to work in the Dairy and Poultry Section of Statistical and Historical Research.

Homer Metzger, who recently completed his Doctor's degree at Pennsylvania State College, has accepted a position as Associate Professor in Agricultural Economics and Farm Management, and Associate Agricultural Economist in the Experiment Station at the University of Maine.

Earl E. Miller has joined the staff of the Bureau of Agricultural Economics, and is assigned to work on livestock price analysis.

L. F. Miller is on leave from The Pennsylvania State College for a year and a half to serve in the Food and Agricultural Division of ECA. He

and his family are living in Paris, as he will work out of the Paris office.

S. Mysak, who has been in charge of the office of the Dominion Economics Division, Department of Agriculture, at the University of Alberta, has resigned his position to go into private business.

Charles W. Nauheim, formerly with Pillsbury Mills, Inc., has joined the staff of the Bureau of Agricultural Economics, Division of Farm Management and Costs, as Agricultural Economist to be stationed at Brookings, South Dakota, where he will be working on economic problems in connection with the Missouri Basin Development research program.

Ernest J. Nesius of the Farm Economics Department, University of Kentucky, received his Ph.D. degree in June from Iowa State College, and has been promoted to the position of Associate Economist.

William H. Nicholls, Professor of Economics at Vanderbilt University, spent the summer in Turkey as Economist to the Barker Mission, sponsored by the International Bank for Reconstruction and Development. He was responsible for those parts of the general economic survey dealing with Turkish agriculture, minerals, forests and fisheries.

A. G. O'Brien received his M.A. degree at Cornell University and has returned to his position with the Economics Division, Department of Agriculture, Ottawa.

D. E. O'Connell, South Dakota State College, will attend the University of Wisconsin to do graduate work in Economics.

Barnard D. Parrish is on leave from Washington State College for one year to take course work toward his Ph. D. degree at the University of Illinois.

Arthur W. Peterson is on leave from the Department of Agricultural Economics, Washington State College, for one year to work for the Pan American Union, conducting research on land classification at Turrialba, Costa Rica.

Donald D. Pittman has come into the Washington office of the Division of Field Crop Statistics, Bureau of Agricultural Economics, from the Columbia, Mo., Office of Agricultural Estimates.

Homer Preston, who recently completed his work toward a Ph. D. degree at The Pennsylvania State College, has joined the staff of the Fruit and Vegetable Section of the Cooperative Research and Service Division of the Farm Credit Administration in Washington, D. C.

Richard B. Rainey, Jr., has joined the staff of the Bureau of Agricultural Economics, where he is working in the Statistics Service Section.

Russell S. Ratcliffe has resigned his position in the Division of Farm Management and Costs, Bureau of Agricultural Economics, to resume farming operations in Virginia.

E. P. Reid, who has been on leave of absence to pursue graduate studies at the University of Wisconsin, has returned to duty in the Economics Division, Department of Agriculture, Ottawa.

Professor Waldo Rowan, who has been studying at the University of Wisconsin, will return to the staff of the University of Georgia in September.

L. T. Smythe, assistant professor at South Dakota State College, has

been granted leave of absence for the academic year for further graduate study at Iowa State College.

John L. Snare has accepted a position as Associate Professor at Alabama Polytechnic Institute. Mr. Snare has been a graduate student at the University of Minnesota the past two years.

J. K. Stern resigned from The Pennsylvania State College January 1 to assume the presidency of the American Institute of Cooperation in Washington, D. C.

Alexander Swantz of the Dairy Branch, Production and Marketing Administration, has returned to Washington after two years of graduate work at the University of Minnesota.

Fred R. Taylor, Instructor in the Division of Agricultural Economics, University of Minnesota 1948-50, will join the staff of Rhode Island State College in September as Associate Professor of Agricultural Economics.

Philip Thair, of the Bureau of Agricultural Economics, stationed at the North Dakota Agricultural College, has been granted leave to participate in a seven week work session on "The Economics of Resource Allocation" conducted at the University of Chicago.

Vladimir P. Timoshenko, Economist and Professor of Commodity Economics in the Food Research Institute of Stanford University, became an emeritus member of the University faculty at the close of the academic year. Mr. Timoshenko is remaining on the staff of the Food Research Institute serving as a consultant.

Robert Tootell has returned to his post of Director of Extension in Montana after a year at Harvard University under a Carnegie Extension Fellowship.

Alvin S. Tostlebe, Head of the Economics Department of the College of Wooster, Wooster, Ohio, joined the staff of the Division of Agricultural Finance, Bureau of Agricultural Economics, as Head of the Farm-Mortgage Section, in July. He will be principally engaged at the outset in a co-operative study with the National Bureau of Economic Research on capital requirements in agriculture.

C. P. Wilson will return to Kansas State College in September after having completed his residence work for advanced study at the University of California. Professor Wilson is in charge of livestock marketing work at Kansas State College.

Ramon Wilson has accepted an appointment as Assistant Professor of Agricultural Marketing Extension with Utah State College at Logan, Utah. Dr. Wilson obtained his Ph. D. in Agricultural Economics at Purdue University in June.

Lawrence Witt, Michigan State College, has been granted leave of absence to participate in a research seminar at The University of Chicago during the summer quarter.

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